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BRISTOL: 20, Victoria Square, Clifton . . . *Bristol 33873*
Annually £5 by post . Single copies, Two shillings.
Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Editor: B. W. C. Cooke, Assoc. Inst. T.

Vol. 111] FRIDAY, OCTOBER 2, 1959 [No. 8

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Engineering Wages Claim

THE wages and hours claim of the engineering unions which was presented at the end of last week was nothing if not ambitious. The demands are for an extra £1 a week in wages and a 40-hour week as against the present 44-hour week. The lack of realism in this claim can be appreciated readily if the total cost to the engineering industry of the country is considered. It is estimated at some 24 per cent, or at least £400,000,000. Not even the unions pretended that the higher wage claim could be justified by any change in the cost of living, for there has been no rise in the index since the last settlement. The union spokesman based his case on the ability of the industry to pay, as shown by the trend of productivity and profits. This must surely be a very tendentious approach, for the variations in both productivity and profits could hardly be wider in any industry, by reason, not only of the very large number of individual undertakings involved, but of the variety of their products and the uneven incidence of demand. In some sectors of the industry there has been a considerable improvement in recent months. There are very important parts of the industry, particularly those engaged in the manufacture of railway supplies and other heavy capital goods, which are having a very lean time indeed and for which the outlook is by no means promising. There is another factor which must weigh in the consideration of a claim of this magnitude. Any settlement that is reached will tend to set the pattern for industrial bargaining in a number of other industries during the coming months. Probably at some time within the course of the negotiations the unions will decide whether to press more strongly for the wage increase or for the reduction in hours. Concession on either of these could be very costly; meeting the joint claim would be disastrous.

S.A.R. Buys Section of Rhodesia Railways

PURCHASE by the South African Railways from Rhodesia Railways for £1,350,000 of the section from Vryburg, in the Cape Province of the Union of South Africa, to the border of the Bechuanaland Protectorate, will result in some changes in operating arrangements. The 112-mile section is the southernmost part of the line from Vryburg to Bulawayo, of which 399 miles are in the Protectorate and 69 in Southern Rhodesia. A year ago responsibility for operating the whole 580 miles was formally transferred from the S.A.R. to Rhodesia Railways. The line and its 14 stations and many sidings had always been owned by the Rhodesia Railways and its predecessor, the Bechuanaland Railway Company, and had been worked with Rhodesia Railways locomotives. Passenger trains, including the through expresses to and from Cape Town, were of S.A.R. stock. These arrangements had continued. The S.A.R. formerly supplied all staff, including engine crews and guards. The main result of the transfer last year had been a change of staff, on which a beginning was reported to have been made. From December 1, Rhodesia Railways will operate the line from Bulawayo 268 miles southward to Mahalapye.

Railway Talking Points

MR. WAYNE A. JOHNSTON, President of the Illinois Central Railroad, makes a practice of sending a monthly message on matters of railway interest to key personnel on the system. The object is to provide subjects for conversation among friends and acquaintances, both inside and outside the service. The subjects for these messages are very carefully selected and, although they do not contain more than 400 or 500 words each, they cover adequately the subject and provide the basic information needed to enable the recipient to quote factually. There can be no doubt of the value of a message of this kind from the viewpoint not only of the railway officer who receives it, but of the wider interest it must attract through the dissemination of knowledge on points directly affecting the welfare of the railway. Something of this kind could very well be adopted by other systems outside America. Properly handled, the priming of railway officers in Britain, for example, might do much to offset a great deal of erroneous thought among the public of British Railways.

Depreciation of Railway Assets

MR. WAYNE JOHNSTON'S September message deals with a Bill being considered by the legislature whereby the value of rolling stock may be depreciated for tax purposes over a 15-year period and the value of other property over 20 years. At present there is a wide difference in America as to depreciation allowances between railway property and those of rail competitors. Aeroplanes may be depreciated over five years, buses are written off in seven years, and heavy lorries in eight years. The average life required to be used for depreciation of all types of railway property is upwards of 40 years. This is particularly onerous when it is considered that a boxcar that cost $2,500 twenty years ago is now priced at about $8,500, and on the present basis of depreciation the railway has to find 6,000 new dollars to meet the difference in cost. To obtain that $6,000 difference from net income, the railway has to earn $12,500 before tax. The present Bill has been endorsed by the Inter-state Commerce Commission as being in the public interest, and if it is adopted by Congress it should help to strengthen the financial ability of the railways to invest in improvements.

XUM

Reduced Fares on Canadian Railways

AN intensive market survey of Canadian travel habits and attitudes conducted over the past year by Canadian National Railways market research office has confirmed that the railways' chief competitor in passenger traffic is the private motorcar. Travel in Canada amounts to about 35,000,000 journeys a year of 100 miles or more. The private motorcar has captured 75 per cent, predominantly in groups; some 11 per cent of such trips are made by rail, and the remainder by bus or plane. The survey indicated that economy fares and the inclusion of transportation, meals, berths and gratuities in a single package price would be the best way of winning passengers to the railways. The two schemes were, therefore, introduced by C.N.R. yesterday. The two plans may also be used in conjunction with the "Go Now—Pay Later" plan inaugurated by C.N.R. recently. The Canadian Pacific Railway has also introduced two new fare reduction plans, similar to the C.N.R. schemes, with a view to stimulating off-season rail-travel. The two plans offer considerable savings and should be of great benefit to travellers during the winter months.

World Bank Loans for Railway Development

THE extent to which the International Bank for Reconstruction & Development has helped in building and improving railways is shown in its report for the year ended June 30, 1959. The report states that the economic climate in which the Bank's operations were conducted was adverse for many of the Bank's member countries, and that 1958 was a year in which foreign exchange difficulties, of greater or lesser degree, were the rule for the less developed countries. Electric power was the largest objective, accounting for $294,000,000 of the $703,000,000 lent. Transport loans took second place, totalling $257,000,000. Most of this was for railway improvements, including $85,000,000 for the Indian railways, $39,000,000 for railway improvement in the Sudan, and $36,600,000 for expansion in South Africa. The $85,000,000 20-year 5¾ per cent loan to India, of September 16, 1958, is helping to meet the foreign exchange costs of betterment under the Second Five-Year Plan. The report gives the cost of the railway programme as the equivalent of $2,360,000,000, of which about $800,000,000 is being spent abroad. In 1957 the Bank made four loans, totalling some $90,000,000, to finance part of the material imported during the first years of the programme.

Expansion in the Sudan and South Africa

THE $39,000,000 20-year 5⅜ per cent loan to the Sudan, of July 21, 1958, is being used to buy rolling stock and other material from abroad for the Sudan Railways railway, port, and river services, including re-laying track with heavier rail and extensions of lines into the South and West. South Africa received two loans in 1958-59 for railway purposes. The $25,000,000 10-year 5¾ per cent loan of December 2, 1958, is helping to finance the South African Railways expansion programme, which includes improvement of some 410 miles of line, electrification of 640 miles, and new construction of 160 miles of branch and suburban lines, besides purchase of motive power and rolling stock. The $11,600,000 10-year 6 per cent loan of June 10, 1959, is giving further assistance in financing the programme. In all the World Bank has now made six loans for improving railways in South Africa, totalling nearly $137,000,000.

U.T.A. Replies to Critics

ILL-INFORMED and hostile criticism has prompted the Ulster Transport Authority to a reply in the form of a 22-page booklet distributed on a wide scale and of an advertisement in the Belfast daily papers. The foreword, bearing the signature of Mr. G. B. Howden, Chairman of the Authority, explains that the statement is "solely for the purpose of explanation and enlightenment." In answer to the allegation that the U.T.A. has been incompetent, an account is given of what it has done to comply with exacting statutory obligations, including the need to pay its way with the additional burden of working the Great Northern Railway system north of the border. A brief reminder of the difficulties besetting a public body which must try to satisfy the demands of sections of the public is given in answer to the charge that the Authority is dictatorial. The particulars of the restricted expenditure on necessary plant, and on profitable ancillaries such as hotels, should go far to refute the charge of extravagance. Loose statements that the U.T.A. is "bankrupt" are shown to be inaccurate by a clear explanation in an outline of the true position. The Authority has been able to carry on business partly by using sums provided out of revenue to finance renewal of assets, partly by depleting its liquid resources, and partly through loans from its bankers, principally to finance the requirements of the G.N.R. Board.

European International Passenger Services

THE annual European Timetable & Through Carriage Conference, held in a different centre each autumn at the invitation of the principal railway administration of the country concerned, has included in recent years sessions on commercial matters. This year the conference on timetables is preceded by a commercial meeting in Venice at the invitation of the Italian State Railways. The Austrian Federal Railways will be hosts at the timetable conference to be held in Vienna on October 7-13. This will be attended by senior officers, in some cases general managers, of railways in Europe and of those linked with the European system, such as the Turkish State Railways; of the International Sleeping Car Company and the German Sleeping & Dining Car Company (D.S.G.) and shipping and other interests concerned with international passenger traffic; of the International Union of Railways (U.I.C.); and of transport ministries. British Railways, as operators of, or closely associated with, Channel and North Sea shipping services, will be represented at both meetings, at Vienna by Mr. S. A. Fitch, Assistant General Manager (Traffic), and Mr. R. E. Sinfield, Shipping & Continental Manager, Southern Region, Mr. S. A. Claydon, Continental Traffic & Shipping Manager, Eastern Region, and their assistants.

Seeing the World by Train

RAILWAY travel is often the best way of seeing a country. The views from the train are usually better than those from the road, and trains avoid ribbon development and other depressing accompaniments of road travel. Railway journeys also give the visitor, especially in an unfamiliar environment in Africa, for instance, or Asia, or South America, glimpses of the inhabitants offered by few modes of travel other than river or lake steamers. No visit to India is complete without those views of the microcosm obtainable at railway stations; it is seldom possible elsewhere to see simultaneously representatives of so many races and creeds. A programme of winter tours arranged by Thos. Cook & Son Ltd. and Dean & Dawson Limited, the subject of brief notice on page 233, provides for comfortable train journeys in several continents. These vary between long trips across India and a relatively short one from Niagara Falls to Toronto, and between a morning run from Luxor to Aswan, up the Nile valley, and another from Lyttelton to Christchurch in New Zealand. The growth of long-distance air travel will increase the numbers taking this kind of holiday. Here are opportunities for railway administrations in the countries visited by tourists, to secure useful passenger traffic.

Faster Passenger Services in France

ACCELERATIONS of passenger services on the French National Railways continue, mainly as a result of further electrification. Completion of conversion at 1,500 V. d.c. of the Valence-Avignon section of the Paris-Lyons-Marseilles-Riviera main line of the South Eastern Region will result, from October 4, when the winter timetable comes into force, in the "Mistral" reaching Marseilles in 7 hr. 33 min. and Nice in 10 hr. 28 min. from Paris. The average speed from Paris to Marseilles will be 70.9 m.p.h., including four stops. Details of this and other changes are given elsewhere in this issue. Unfortunately, few of these improvements affect travel by British Railways routes between London and Paris. A first class diesel railcar between Longueau (near Amiens), Boulogne, and Calais, connecting at Longueau

with a Paris-Lille electric express, reduces the journey time from Paris to Calais to 3 hr. 6 min., the shortest yet scheduled, and considerably shorter than that of the fastest steam-hauled boat train from Paris. It is to be hoped that the S.N.C.F. will accelerate its Anglo-French services via the Short Sea routes. British Railways, Southern Region, is improving its boat train services between London and Folkestone and Dover as a result of electrification.

The Present-day Apprentice

MANY a senior railway officer still serving will find difficult to believe the picture of the present-day apprentice as shown in a recent survey by the Industrial Welfare Society. To those who have retired, and whose apprenticeship, therefore, took place even longer ago, the changes which are shown by the survey must border on the fantastic. A typical industrial apprentice at the present time, based on a review of 400 who attended the annual Industrial Welfare Society apprentice conferences at Oxford, lives at home; less than 10 per cent are in lodgings, and only very few in hostels. Most of them have savings; 40 per cent of the lads up to £50, nearly 20 per cent between £50 and £100, about the same percentage between £100 and £250, and more than 5 per cent over £250. Half of them have life insurance policies and nearly 20 per cent own motorcars. Almost 5 per cent are married. All this is in striking contrast to the iron discipline in locomotive, carriage and wagon, and similar engineering workshops at the beginning of the century when lads worked hard to learn their crafts for very little, or in some cases, no pay.

Insurance Against Strike Losses

ACCORDING to reports from Washington, member companies of the Association of American Railroads have adopted an insurance plan to protect them against financial losses resulting from stoppages at work. A spokesman for the Association has stated that hitherto the American railway has had no protection against work stoppages that violate the provisions of the Railway Labour Act or which occur in defiance of recommendations of a Presidential Emergency Board. Apparently, the premiums to be paid by each of the various railways will depend both on the number of its employees and the scope of operations of the line. The basic idea is one which should have a wide appeal in present-day conditions, but it might not be without its complications if it removed the threat of financial disaster as a result of a withdrawal of labour. The possibility of incurring losses which might result in closure of a line should act as a deterrent to irresponsible industrial action by both parties to a dispute.

New L.T.E. Depot at Upminster

UPMINSTER Depot is the first completely new depot to be built for the London Transport Executive since the war. Built at a cost of £1,000,000, it is the only Underground depot on the east side of London serving the District Line, replacing inadequate facilities previously provided at East Ham Depot, and giving a more efficient distribution of training servicing, maintenance, and stabling between the east and other sections of the line. The construction of the depot and facilities provided are described elsewhere in this issue. Among its special features are a control tower fitted with talk-back apparatus, enabling instructions to be given from the tower to drivers through trackside loudspeakers heard by the driver only, and microphones enabling him to reply at ordinary speech level; complete control of all points by thumb switches, in the control tower; and two train washing machines. The use of walkie-talkie apparatus to provide instant communication between a shunter-driver and the control tower is of special interest, the set having been designed by London Transport engineers. It is fully transistorised, and considerably lighter and less bulky than a valve type receiver.

Henschel No. 30,000

ALTHOUGH the 30,000th locomotive to be turned out of the Henschel plants in Kassel is a diesel, and the first Henschel diesel locomotive was completed 35 years ago, this great works will ever be associated in memory with the steam locomotive. Of electric locomotives it has built a considerable total in size, up to some of the 130-ton Bo-Bo single-phase machines for the Westphalian brown-coal industry; but nothing can approach the extraordinary wealth of types and designs of steam locomotives produced for over 70 countries since the first locomotive was completed in 1848. By a curious coincidence that locomotive was an American-type 4-4-0, bearing strong resemblance to the Norris designs from Philadelphia, while No. 30,000 is a diesel of American type with the General Motors type of equipment. Yet in the interim one might almost say that the production was pan-German in conception and design. Besides remarkably proportional normal types, Henschel has been identified prominently in their respective times with pulverised-coal and condensing steam locomotives, and has made its efforts with multi-engined individual-axle-drive and super-pressure locomotives. Like other celebrated European locomotive builders, for example, Maffei and the Austrian industry, its first chief engineer was an Englishman.

Railways Aid to Indian Steel Industry

THE expansion of heavy industry in the Republic of India is now so rapid that it is not easy to follow its details. Ten years ago there were three privately-owned iron-and-steel-producing undertakings in the country: the Indian Iron & Steelworks at Burnpur, the Tata Iron & Steel works at Jamshedpur and the Mysore Iron & Steelworks. These plants are now being extended and developed so greatly that their combined output is being increased from 1,140,000 tons to 2,400,000, production thus being more than doubled. In addition, three new Government plants are now coming into production: (1) at Durgapur on the Eastern Railway, 110 miles north-east of Calcutta; (2) at Rourkela, in Orissa, 257 miles west of Calcutta on the South Eastern Railway (former Bengal-Nagpur) main line to Nagpur; and (3) at Bhilai 539 miles from Calcutta on the same line. Also, as stated in an editorial article in our June 12 issue, and in an illustrated article in that of June 26—August 14, a fourth new iron and steelworks is being established near Chandrapura in the Bokaro Coalfield area as well as a foundry, forge and steel fabrication plant at Hatia, near Ranchi in Bihar.

The Durgapur plant is designed initially to produce 240,000 tons of commercial steel sections, 200,000 tons of light structural sections, 150,000 tons of billets for re-rolling, 100,000 tons of forging blooms and billets for sale, 60,000 tons of sleeper bars, and 40,000 tons of wheels and axles for railways. Meanwhile, Rourkela is concentrating on the production of flat rollings, namely, 200,000 tons of heavy wide plates, 300,000 tons of hot-rolled and 170,000 tons of cold-rolled sheets and strips and 50,000 tons of tinplate. On the other hand, Bhilai will, on completion, be producing 200,000 tons of rails and sleeper bars, 284,000 tons of heavy and light structurals, 136,000 tons of rounds, squares and narrow flats, 150,000 tons of billets for the rolling mills, and also 300,000 tons of pig iron for sale. The intended out-turn from the Bokaro plant is 2,500,000 tons. All these plants are designed so that their output can eventually be doubled.

The increased output of iron and steel under the development scheme that will be available in a few years' time will thus be :—

From the three old plants	1,260,000	tons
,, Durgapur	790,000	,,
,, Rourkela	720,000	,,
,, Bhilai (excluding pig)	770,000	,,
,, Bokaro	2,500,000	,,
Total	6,040,000	,,

Judged by another source of information these figures are very conservative. In considering the tonnage that will have to be carried by the railways it must be remembered that for every ton of steel produced about five tons of raw materials are required. It is estimated that by 1961 the volume of traffic that the six steel plants will require the railways to handle is 26,600,000 tons. The Bokaro plant will not then be in production presumably. The total estimated cost of the first three new plants being established by the Government of India is Rs 560 crores or £420,000,000. At present-day world prices it is expected that the aggregate value of the products will be some Rs 147 or, say, £110,000,000 when full pro-

duction has been attained. Apart from the rails, sleepers and other steelwork these plants will produce the Eastern and South Eastern Railways are closely concerned with them in the carriage of coal from each. Durgapur is close to the coalfields, but its iron ore comes from the Bolani mines 150 miles distant. Also for the time being limestone has to be carried 236 miles from Birmitrapur near Rourkela.

Rourkela and Bhilai, on the other hand, are quite close to iron ore belts, and good limestone deposits are also near at hand. Coal, however, as explained in detail in our issue quoted above, will have to be railed to them 220 and 500 miles, respectively, from Bokaro. The new Bokaro plant, like Durgapur, has coal at hand but its limestone will come over the new railway 180 miles from near Rourkela.

To move these raw materials and the finished steel and iron products, some 300 miles of new railway are being constructed, including the 184-mile Chandrapura-Bondamunda link, a 56-mile and a 14-mile iron ore and limestone feeder line, respectively, into Bhilai, and a 45-mile iron-ore line into Rourkela. To feed the latter with limestone the last 10 miles of the new line from Chandrapura into Bondamunda are being built in advance. Moreover, some 530 miles of existing lines are bing doubled, new yards are being constructed at Rourkela, Bhilai and elsewhere, and about 550 miles of electrification are being carried out in the whole area to facilitate mineral haulage. Specially-designed heavy-duty wagons are being built for this traffic.

Furthermore, great quantities of materials are being railed for the construction of these great plants and the towns springing up to house the employees. They include many very heavy and some out-of-gauge loads, for which special well—and other types of wagon carrying up to 180 tons are now being used.

Many problems are arising, as for instance in connection with bridge portals; to pass over-size consignments the track has had to be lowered in some places to clear them. The railways are also assisting the rapid steel-production development by training skilled workers in their shops and by the loan of officers of all grades.

Southern Region Winter Timetable

DESPITE the printing dispute, the winter timetable book of British Railways, Southern Region, appeared in the week in which the winter train service originally was planned to come into force, but, in conformity with the other Regions, the book will not become effective until November 2. A notable change is the responsibility assumed by the Southern Region for all the Channel Islands boat trains, to and from both Southampton and Weymouth.

The Weymouth boat train, on Mondays and Fridays until April 30 and Tuesdays, Thursdays and Saturdays from May 2, will have the same departure time (9.15 p.m.) as the Southampton train (the latter on Wednesdays to April 30, then Mondays, Wednesdays and Fridays); it will call at Basingstoke, Southampton, Bournemouth Central and Poole, and reach Weymouth Quay at 12.54 a.m. The steamer will be due in Jersey at 9.15 instead of last winter's 9.30 a.m., so that, compared with the present London departure from Paddington at 6 p.m., the London–Jersey journey will be shortened by 3½ hr. to 12 hr. Inwards, journey times will be practically the same; the 7.32 p.m. arrival at Paddington compares with the new 7.35 p.m. at Waterloo. The Waterloo train will leave Weymouth Quay at 3.45 p.m., and call at Poole, Southampton Central, and Basingstoke. Bournemouth will be avoided by taking the Ringwood line.

The usefulness of these boat expresses might be considerably extended if they were allowed to carry passengers to and from intermediate stations, especially at 9.15 p.m. from Waterloo to Bournemouth. As they do not appear in the main Waterloo-Bournemouth-Weymouth table, such facilities do not seem to be intended.

The daily through train between Margate, Dover, Folkestone, Hastings, Eastbourne, and Brighton and Birkenhead, via Redhill, Reading and Oxford, is to be withdrawn from November 2. When it is restored next May, it will run to and from Wolverhampton only. The Birkenhead-Bournemouth train is to lose its through refreshment car service. In future, a car will be provided between Wolverhampton and Banbury only, allowing only a single service of luncheon, but light refreshments will be obtainable in these trains between Oxford and Bournemouth.

In contrast, Pullman and refreshment facilities are to be restored to the Central Division trains from which they were withdrawn in the winter of 1958-59, since when the cars have run empty and locked on all trains beginning their journeys after 8 p.m., save only the 8.25 p.m. up "Brighton Belle." Pullman accommodation will now once again be available on 9, 9.28, 10, 11 p.m. and 12 midnight trains from Victoria to Brighton, the 8.45 and 10.45 p.m. to Eastbourne and Hastings, the 10.45 pm. to Bognor Regis, and, in the reverse direction, in the 8.35 p.m. from Eastbourne, 7.9 p.m. from Littlehampton, and 9.25 p.m. from Brighton to Victoria.

The principal change compared with last winter is the radical improvement in the Kent Coast service brought about by electrification. Apart from the withdrawal of seasonal relief trains, this is being maintained in full during the winter. Thus at 40 min. past every hr., between 7.40 a.m. and 10.40 p.m. inclusive, an express train runs from Victoria to Chatham, Herne Bay, Margate, and Ramsgate, with the 11.30 p.m. from Victoria and the 4.44, 5.14, 5.44 and 6.14 p.m. from Cannon Street in addition, an increase of exactly 50 per cent on the number of trains available last winter. The average journey times are cut by 28 min. from London to Margate, and 34 min. from London to Ramsgate. The same improvement is seen, on the up journeys, and the elaborate system of through portions and connecting trains equally benefits Canterbury, Dover, and Sheerness. Except at certain hours of the day, the quickest route between London and Dover is now by electric train via Chatham and Canterbury.

Passenger Comfort

LETTERS in the daily newspapers on increasing seating capacity at the expense of comfort in air liners have shown than many travellers do not wish to sacrifice comfort to shortness of transit. Although railways cannot compete with air over the longest distances, they can offer great comfort and conveniently short journeys in overnight and morning and evening runs of, say, 100-400 miles. It is important in designing stock for high-speed day trains that the temptation be withstood to crowd passengers so as to save weight and space. Some Continental designers have gone too far in that direction. People who go by train desire not the restricted spaces of an aircraft, but roominess, which with safety is one of the attractions of surface travel. Where refreshments are brought to passengers in their seats, the first class Pullman car in Britain and on the Continent, with a centre gangway between single chairs, affords probably the maximum comfort.

Many passengers prefer to stretch their legs in a walk to a refreshment car or bar compartment. This fact is recognised in recent designs of multiple-unit diesel trains in several countries. For vehicles running in conjunction with a refreshment car the first class side-corridor coach standard on Britain and on the Continent, seating three a side, seems the best vehicle for medium and long distances. In second class the problem is to achieve a satisfactory payload. New second class corridor coaches for British Railways are open saloons, because two seats on each side of a centre gangway is felt to give the best possible comfort compatible with seating four a side. Much British Railways side-corridor stock seating eight to a compartment is comfortable, and has the advantage of ample rack space over each seat, hard to provide in an open saloon. The French National Railways and other Continental administrations are experimenting with reclining chair cars. Their disadvantage for many British travellers is the absence in an open vehicle of the privacy afforded in the side-corridor coach.

In a compartment the effects are localised of the control by one or two passengers of the opening of windows. In Britain and in some countries with less equable climates many passengers prefer windows which can be fully opened. Some Continental managements prefer, in vehicles which have doors only at the ends, large drop windows through which hand baggage can pass. No doubt public tastes were studied before fitting many vehicles in Britain and other countries with fixed windows, which seems a general tendency. There is much to be said for air conditioning even in the British climate, especially in trains used mainly by business men, who wish to read or

transact affairs. Some return on the outlay moreover is obtainable in the first class fare and a possible supplementary charge. Pressure ventilation, which does not require windows to be closed, affords some of the advantages of air-conditioning but without such exact adjustment of temperature.

Only in the layout of seating for travel by day does there seem to be a risk of affording less than desirable comfort. This does not apply to sleeping cars, in which the tendency generally is to continue to provide adequate space. The "roomette" accommodation on Canadian and U.S.A. railways, providing self-contained sleeping and toilet facilities for one person, and the "special" type cars of the International Sleeping Car Co. Ltd., which contain 20 single-berth compartments, combine comfort with reasonable payloads. These arrangements are felt by some people to be too restricted in space, but more roomy accommodation is usually available at a correspondingly higher price.

Rhodesia Railways in 1957-58

THE report on the Rhodesia Railways, a copy of which we have received from Mr. J. W. S. Pegrum, the General Manager, covers the period from April 1, 1957 to June 30, 1958. The financial year was altered to terminate on June 30, instead of March 31, at the request of the Federal Government. Railway activity continued at a high level during the calendar year 1957, but economic considerations in the Federation subsequently resulted in a sharp reduction in traffic in the last quarter of the period under review. There were no restrictions on the acceptance of general goods, except during the usual holidays.

During the year 103 miles of complete relaying with 80-lb. rails was carried out, of which 87¾ miles related to the completion of this work on the Umtali-Salisbury, Somabula-Bannockburn, and Broken Hill-Ndola sections, the remaining 15¼ miles being between Nkana and Chingola. The Kildonan Branch (24½ miles) was relayed with 60-lb. rail and 10 miles of complete relaying with 60-lb. rail was also carried out on the Lomagundi Branch. Other track renewals included 54 miles of hardwood re-sleepering on various sections, 91 miles of initial stone ballast placed under the track, and extra stone provided to make good the standard of 1,600 cu. yd. per mile over a further 120¾ miles throughout the system.

Centralised traffic control was completed between Lukosi and New Wankie and between Gwaai and Sawmills. Work commenced on the Sawmills-Nyamandhlovu, Wankie-Thomson Junction, and Thomson Junction-Livingstone sections, whilst a considerable amount of planning was undertaken for the installations on the Umtali-Gwelo and Livingstone-Ndola sections. The installation of points indicators between Umtali and Salisbury was completed.

Telecommunication works completed include a three-channel carrier system from Gwelo to Malvernia, single-channel systems from Broken Hill to Kafue and to Ndola, and the erection of additional line wires from Plumtree to Lobatsi.

The doubling of the line between Cement and Heany Junction was completed in June, 1958, and the double track opened to traffic just after the end of the period covered by the report. Doubling between Lochinvar and Highlands Road was also completed and authority has been given to extend the work from Highfields Road to Salisbury. The series of deviations between Livingstone and Simba was completed and opened to traffic.

Seven diesel-electric locomotives and 40 Garratt locomotives were placed in service during the 15 months ended June, 1958. Three steam shunting locomotives and seven "13th" Class Garratts were withdrawn, the total complement at the end of the period being 429, an increase of 37 compared with the position as at March 31, 1957. The tractive effort increased from 16,402,045 lb. to 18,990,579 lb. Wagon stock in service comprised 11,683 vehicles, the total carrying capacity, excluding tank wagons, guards vans, and all departmental vehicles, being 431,949 tons as against 434,321 tons 15 months earlier. A total of 148 vehicles of various types were withdrawn and 100 new wagons placed in service.

The entry into service of 47 new locomotives resulted in adequate power being available, for the first time for some years, to meet all requirements. In consequence of this position, coupled with the easing in traffic demand towards the end of 1957, engine utilisation showed a decrease, but on the other hand efficiency figures all reflected considerable improvement.

The following are some of the principal results; the 1957-58 figures cover a 15 month period.

	1956–57	1957–58
Miles open	2,722	2,740
Gross ton-miles (thousands)	9,497,256	9,763,258
Average haul (miles)	397	384
Train-miles (north of Bulawayo)	12,503,830	12,301,468
Tonnage conveyed:		
General merchandise	4,794,340	6,497,595
Coal and coke	3,718,119	4,711,088
Minerals	2,588,698	3,658,829
Total	11,101,157	14,867,512
Receipts:	£	£
General merchandise	14,189,191	17,906,818
Coal & coke	3,175,671	4,145,943
Minerals	7,034,488	10,929,983
Coaching	2,003,519	2,583,219
Total revenue	27,191,706	36,591,026
Total expenditure	21,288,436	28,514,395

Midsummer Fall in Freight Traffic

(By a correspondent)

THE volume of freight train traffic always falls to the lowest level for the year in the eighth four-week period from July 13 to August 9, or thereabouts. This year British Railways originated 13,494,000 tons, a decrease of 64,000 tons, or 0.5 per cent, from 1958. That was a lean year when 2,975,000 fewer tons were put on rail than in 1957. Compared with the good year 1953, the fall in tonnage for the period was 3,701,000 tons, or 21 per cent.

Merchandise and livestock accounted for 2,453,000 tons, an increase of 114,000 tons, or nearly 5 per cent, on last year. Compared with 1957, however, there was a decrease of 178,000 tons and the decline from 1953 was no less than 737,000 tons, or 23 per cent. The upward trend over 1958 was probably due to rate reductions as merchandise receipts were fully 3 per cent lower.

There was a welcome rise of 29,000 tons, or 1 per cent, in mineral traffic; the average length of haul also lengthened and revenue from minerals increased by £233,000, or 9 per cent. The slump in coal and coke traffic continued. While carryings dropped by 207,000 tons, or 2.6 per cent, revenue fell by £719,000, or 11 per cent. Much of the coal was hauled for shorter distances and the railways worked 52 million fewer coal ton-miles, a decrease of nearly 11 per cent.

The position at August 10, when 32 weeks of the year had gone, was that the railways had lost 28,732,000 tons of their 1957 traffic, or nearly 17 per cent. They had worked 2,357 million fewer ton-miles than in 1957, or in other words had done about 18 per cent less work. Yet 1957 was not a great year compared with 1953 when British Railways originated 289 million tons of revenue traffic and worked more ton-miles than in any year except 1951.

Inevitably freight train traffic is producing less revenue as the years pass. In 32 weeks this year the decrease from 1958 was £17,337,000, a loss of 10 per cent, according to the preliminary statement in No. 8 of *Transport Statistics*. As the 1958 receipts were £12,580,000, or 7 per cent, below 1957, the financial situation grows rapidly worse. Another million of freight train receipts disappeared in four weeks to September 6 and, with coal output falling at the rate of 5 or 6 per cent every week, there is no prospect at present of a change for the better.

The setback affected all Regions. The Eastern escaped lightly with a drop in carryings of 326,000 tons—about one per cent—and a decrease in ton-miles of 114 million, or 4.8 per cent. In contrast the Western lost almost 2 million tons, or nearly 8 per cent, and worked 112 million fewer ton-miles, a decrease of about 5 per cent. The London Midland, with the densest traffic, moved 3,378,000 fewer tons, a fall of 7.6 per cent, and produced 306 million, or nearly 8 per cent, fewer ton-miles. The North Eastern and Scottish Regions suffered most, losing over 10 per cent of their 1958 traffic and turning out about 12 per cent less ton-mileage. The country north of the Mersey and the Humber is bearing the brunt of the recession, not for the first time.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of Correspondents)

Widening of L.T.E. Metropolitan Line

September 25

SIR,—The comparison Mr. W. Loch Kidston draws in his letter in your September 11 issue between the time taken for completing the St. Lawrence Seaway and that for the electrification and four-tracking of the Metropolitan Line is not valid. The construction of a completely new civil engineering work is radically different from the re-fashioning of an existing railway under traffic, when full passenger services must be maintained and when some stages of the work must be completed before others can be started, with extremely limited periods of engineers' possession for key sections of the track.

The extensive civil engineering works on the Metropolitan Line have in fact been organised to a programme which is most intensive for the class of work involved.

Yours faithfully,

R. M. ROBBINS
Chief Public Relations Officer

London Transport Executive, 55, Broadway, S.W.1

The Former G.C.R. Main Line

September 26

SIR,—I refer to Mr. D. J. Manton's letter in your September 11 issue. A junction south of Leicester which would have enabled G.C.R. line trains to run into Leicester London Road existed between Whetstone (G.C.) and Blaby on the Birmingham to Leicester line in 1916—24. The culverts and bridges still remain, but part of the bank was removed in 1941 to provide a foundation for a nearby landing strip. North of Nottingham Victoria, G.C.R. line trains could have reached the Midland line for Sheffield via the junction at Codnor Park with the Pinxton branch up to 1953, when this connection was removed.

Nottingham Victoria is much better situated than is the Midland station. The G.C.R. route south of Nottingham is not more severely graded, except over the Metropolitan Railway south of Aylesbury, but the most G.C.R. goods traffic always ran either to Banbury or via High Wycombe to London. At the London end a connection at Neasden, where there is plenty of space, with the Dudding Hill line, and facing towards Cricklewood, seems practicable. It would give direct access to and from St. Pancras, so enabling Marylebone terminus, which is not easily accessible, to be closed to passenger traffic by dividing this between St. Pancras and Paddington.

Yours faithfully,

R. G. R. CALVERT

45, Woodwaye, Oxhey, Herts.

September 15

SIR,—May I refer to Mr. Manton's letter in your September 11 issue? His suggestion of a new station at Loughborough and a connection between the former Great Central and Midland Railway lines would not help travellers much. Both the existing stations are far from the town centre, and the new station would be about half-a-mile further away still.

As to Chesterfield, connection should be south of that town, where there is some spare land near Horns Bridge, under the old Lancashire, Derbyshire & East Coast Railway viaduct, rather than at Whittington Moor, where circumstances are not so favourable. This would mean using the Midland instead of the Central Station. The stations are only 300 yd. apart, and the main road to the town centre passes between them. It is doubtful whether the platforms at Central can accommodate a train of over nine bogie vehicles without the need to draw up. Southbound trains from Chesterfield Central face a rising gradient of 1 in 90 for the best part of three-and-a-half miles up to Holmewood Colliery, subject to subsidences as well.

As the "South Yorkshireman," which runs between Marylebone and Bradford Exchange over the former G.C.R. main line, is to be withdrawn, I suggest that the Bradford portion of certain trains from St. Pancras, the former M.R. West of England main line, and Birmingham New Street be detached at Chesterfield Midland. The Leeds portions would continue by the usual route. The Bradford portions would run over the Rother Valley line to Beighton Junction (M.R.) and thence over the spur to Beighton (G.C.R.) and so to Sheffield Victoria and on to Bradford by the route of the "South Yorkshireman." That would improve the service to Huddersfield, Halifax, and Bradford, now badly served except by trains to and from Manchester and Leeds.

Yours faithfully,

D. J. WORRALL

27, Nether Edge Road, Sheffield, 7

Kent Coast Electrification

September 20

SIR,—In your September 18 issue, Mr. F. D. Y. Faulkner seems to have overlooked the important defect in the present track arrangements between Shortlands and Swanley. Most services are now worked on a fixed interval basis nearly all day. Despite the claim of being better able to maintain sequence, the respective services do not use the same platform at Bromley South. As Bromley South is a major interchange station, probably well over half such passengers have to use the footbridge now, whereas if the old track arrangement were still used practically none would need to. If, due to late running or change of sequence, platforms are altered, trains are further delayed by conflicting streams of passengers.

With four tracks available and 16 trains an hour (a half-hourly service each way over four routes) there is no difficulty in planning services so that no conflicting movements meet at the junctions, Shortlands, Bickley (part of Chislehurst), and Swanley, if trains run in sequence and on time, whatever the track arrangements. We have studied the possible conflicting movements under the present and past arrangements and find no advantage in the present order. There is one serious disadvantage in that any service requiring transfer from, say, one up track to the other, must block a down track.

Yours faithfully,

A. F. WOOTTON

Bridport, Crockenhill Lane, Eynsford, Kent

Southern Region Passenger Services

September 25

SIR,—The letters of Messrs. P. J. Harding and J. B. Latham published in your September 4 issue call for comment. I entirely agree that in the Kent coast electrification and in the Hastings diesel-electrification schemes the Southern Region has done a very good job and has increased productivity by frequency of service and improved timing, out of all proportion. All this has been achieved with a constantly growing suburban and quasi-suburban traffic involving the running of more and longer trains.

Curtailment in the midst of expansion presents a gloomy picture. Threats of abandoning services are rife and inquiries for definite information seem to be side-tracked. Closure is reported to be under examination of the Crowhurst to Bexhill West branch. Travel by this branch involves a change at Crowhurst for the main-line Hastings to Cannon Street or Charing Cross trains. The best of these are allowed 90 min. each way, including the change at Crowhurst. The line is used each day by a fairly large number of businessmen (in proportion to the population of Bexhill) and casual travellers. Closure of the line would mean use of the alternative slower route via Eastbourne and Lewes to Victoria or London Bridge in trains already fully loaded with Eastbourne, Lewes, and Haywards Heath traffic. Bexhill would be deprived of a direct service to and from Tunbridge Wells, Tonbridge, and Sevenoaks.

Mr. Harding would find a talk with house agents in Bexhill and district as rewarding as one with their Folkestone colleagues. They are under no illusions as to what closure of the direct line to London would mean to the prosperity of the town.

Yours faithfully,

S. W. GITTINS

Seadown, First Avenue, Bexhill-on-Sea

THE SCRAP HEAP

Windermere Lake Service Record

The 500,000 passengers carried already this season by steamers of British Railways, London Midland Region, for cruises on Lake Windermere, constitute a record for the service. The number is over 6,000 more than last year. The previous highest total was 12 years ago when there were 492,668 passengers.

"It Makes Money"

Under the above heading the *Chicago Daily Tribune* of July 7, recorded the visit of the Queen and the Duke of Edinburgh to the Chicago Science Museum. The account continued: "When the royal couple looked at a scale model of the Santa Fe Railroad, Philip asked Daniel M. MacMaster, museum director, what line it was. Told, he then asked 'Does it make money?' The answer was 'Yes.'"

New Lease of Life

A first-class coach which has been used by the Rhodesia Railways for 58 years and is no longer fit for service on any of the R.R. passenger services has recently been reprieved. It has been sold to the Zambesi Sawmills Railway for £200. The coach cost £3,027 5s. 9d., in 1901, and formed part of a "train de luxe" comprising three sleeping cars, two dining cars, two smoking and buffet cars, and a baggage and postal van. The train was built by Metropolitan Cammell Carriage, Wagon & Finance Co. Ltd., and was used before the first world war between Cape Town and Bulawayo. It is also believed to have been used for special excursions from Cape Town to Victoria Falls.

The first-class saloons had four compartments, one coupe, a wash room, a shower bath, and two lavatories. Tables were provided but not wash basins in the compartments. Smoking and buffet cars had settees and lounge chairs. Fares were at the ordinary first-class rate and a conductor in a frock coat with gold braid was in charge of the train.

Sleeping and dining cars were equipped with fans from the coach lighting system, an innovation in those days as Cape Government Railway coaches were then generally supplied with electricity from a dynamo in the baggage van.

Zambesi Sawmills has also purchased a number of locomotives and wagons from Rhodesia Railways for its own line which runs from Livingstone northwestwards to Mulobezi.

Disused Dublin Terminus Sold

Harcourt Street Station, Dublin, a former terminus of the Dublin & South Eastern Railway, closed to traffic on December 31, 1958, by Coras Iompair Eireann, was sold recently as one lot by public auction for £67,500. Included in the lot were premises now leased, bringing in over £3,000 a year in rent. The buyer was a Dublin estate agent acting for a client whose identity was not disclosed. The Harcourt Street to Bray via Foxrock line of the then Dublin & Wicklow (later Dublin Wicklow & Wexford and subsequently D. & S.E.) Railway was opened on July 10, 1854. The architecture of the terminus, in Italianate style, has been much admired. Despite the substitution of diesel for steam trains in recent years, there was a heavy loss on the Harcourt Street to Bray passenger service.

Samuel Smiles Lived Here

A man who wrote one of the first books which told people how to be a success has been remembered by London County Council. A blue plaque has been fixed by the Council on to the wall of the house which was paid for by the first royalties from his book. He was Samuel Smiles, and the book which made him world-famous by selling over 10 million copies was "Self Help." It told the Victorian world that there was room at the top for anyone prepared to use initiative. Smiles who had been doctor, journalist, and secretary of the South Eastern Railway, published "Self Help" in 1859. From the first part of the proceeds he moved to Lewisham. He died at the age of 92. The plaque, which the L.C.C. has fixed outside his old home in Granville Park, Lewisham, reads: "Samuel Smiles (1812-1904) Author of Self Help lived here."—*From "The Evening News" of June* 15, 1959.

[Dr. Samuel Smiles had earlier been secretary of the Leeds & Thirsk Railway. He was also joint founder with Edward McDermott in 1864 of *The Railway News*, a constituent of *The Railway Gazette*. Some of his most widely read books are his "Lives of the Engineers," beginning with George Stephenson.—ED., *R.G.*].

Travelling Libraries for Railwaymen

Library vans for staff at outlying stations are operated by railways in several countries. In northern Sweden, for instance, one such van serves railwaymen at stations in sparsely populated country, at some distance from larger centres. The South Eastern Region of the French National Railways has introduced a mobile library to serve 12,000 railwaymen and their families in 26 centres, a few of them remote from large towns. The vehicle is called a bibliotrain. It is 33 ft. long and includes a reading room with three round tables, each with three armchairs round it, in line down the centre. Mahogany shelves which tilt slightly from front to back run along long sides, and give room for 7,000 volumes. On each side three bay windows break the range and give light by day, while by night there is fluorescent lighting and also an emergency lighting plant. Beyond the reading room there is a book store, lavatory, kitchen, heating unit, and other amenities for the librarian. There is provision for adult and child readers. Books may be read in the carriage, or borrowed for return at the next visit. Each tour takes 33 days.

Putting the Festiniog on the Map

In our September 4 issue, "A.V.D." pointed out the omission of the Festiniog Railway from the Railway Clearing House map and "Hand-Book of Stations." This, he stated, was the reason for giving, in our June 5 issue, to the Talyllyn Railway Preservation Society, credit which should be shared by the Festiniog Railway Society. A member of the Railway Clearing House staff has replied:

Continuos tenui cursus
The Clearing Housemotto doth state.
"Unbroken ways have I kept"
One freely does translate.
And thus, A.V.D., you were so right
When searching our map so forlorn,
For when we did last issue it
'Tis true the F.R. had gone.
But should the D.I.Y.* still have the steam
When next we go to press
Then there it will be, as large as life,
As plain as the T.R.P.S.
The "Hand-Book of Stations," a similar plea,
Will not have so long to wait
For we shall see the matter right
In Amendment Leaflet 8.

* Do it yourself.

Obsolete Rhodesia Railways passenger coach purchased by the Zambesi Sawmills Railway

XUM

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

VICTORIA

Grade Separation Scheme

The railway level crossing at Warrigal Road, Oakleigh, is to be abolished and an underpass constructed at an estimated cost of £400,000. Work on the project is expected to commence in about 18 months' time. The approved plan provides for an underpass with two 26-ft. roadways with pedestrian subways under the railway line on both sides of Warrigal Road. In addition, two footbridges will be provided over the underpass, on both sides of the railway bridge while there will be a 24-ft. service road, at the existing level, for properties on the west side of Warrigal Road. Thirty per cent of the money required for the project will come from the level crossings fund; the Country Roads Board and the Victorian Railways will provide 45 per cent and 25 per cent, respectively.

Bridge Reconstruction

The accompanying illustration shows a stock train crossing the bridge over the Hume Reservoir between Huon and Tallangatta on the Wodonga-Cudgewa branch in north-eastern Victoria. Considerable deviation and relocating was carried out on this branch because of enlargement of the storage capacity of the reservoir.

The bridge is 1,866 ft. long, and consists of 31 spans, each 60 ft. in length, and to cope with future higher water levels it had to be raised by 8 ft. This was accomplished without interference to traffic (except speed restrictions) and was acclaimed as something of an engineering feat. Two 40-ton hydraulic jacks were used at each of the 32 piers to raise the plate girders 15 in. at a time to allow concreting of the piers to a higher level. In addition to lifting the bridge it was lengthened by 120 ft. and a new 40-ft. span constructed at each end and approaches regraded.

RHODESIA

Vandalism on Passenger Trains

In the past few months there have been a number of incidents of hooliganism and vandalism on passenger trains. The Railway train staff have been instructed that offenders are to be warned immediately that such behaviour will result in police intervention and that they may be required to leave the train at the first stopping place. If it becomes necessary to call the police to a train they will be advised that the Railway Administration will consider prosecuting the offenders.

Traffic Figures for 1958-59

Rhodesia Railways traffic figures for the year ended June 30, 1959, show that there was a decrease of nearly 10 per cent in the total traffic carried compared with the previous 12 months, the actual figures being 11,560,454 tons for 1957-58 and 10,531,509 for 1958-59. There was, however, an overall increase of 105,220 in the number of fare paying passengers to a record number of 3,864,565. There was a decrease in the first class passengers: 57,720 (59,081), but in all other classes there were increases, these being second 168,974 (162,880), third 218,766 (215,923) and fourth 3,419,105 (3,321,461).

In the 12 months under review liquid fuel traffic went up by some 3,000,000 gal., the totals being 121.8 million gal. (118.8 million). Although the total tonnage for minerals was generally down, copper showed up well with a record 697,511 tons (639,555). Loadings reached this high figure despite a bad period during the last quarter of 1958 caused by the miners' strike. There was also a big increase in livestock traffic the number of head transported rising to 336,431 (260,656).

The main minerals showing a decline in loadings were chrome ore 567,317 (701,250), asbestos 111,561 (126,021), limestone 516,189 (535,404), lithium 71,548 (94,397), zinc 57,701 (59,464), coal and coke 3,416,921 (3,731,326). Under the heading other minerals there was a substantial rise to 248,542 tons (210,386). The total for all minerals was 2,745,513 (2,914,386). General goods traffic which is generally the most remunerative, fell from over 4,750,000 tons to rather less than 4,250,000. Vehicle mileage decreased by some 20,000,000 to 242,178,000 and train mileage by rather less than 1,500,000 miles to 10,886,935.

INDIA

New Broad-Gauge Line

The Eastern Railway will undertake, during the current financial year, the construction of a 33-mile broad-gauge line from Bukhtiarpur on the main line to Rajgir at a cost of Rs.25,000,000. The broad-gauge line will follow generally the alignment of the existing 2 ft. 6 in. narrow-gauge line which was built between 1903 and 1911.

When completed, the Bukhtiarpur-Rajgir branch will provide a more convenient railway connection to two of the well-known Buddhist centres of culture and religion; Nalanda and Rajgir. The line will also serve the highly populated and fast-developing town of Bihar Shariff. Acquisition of land for the new line has already started.

Eastern Railway Passenger Services

Completion of the Howrah (Calcutta) area suburban electrification and of the Ganges Bridge near Mokameh has enabled the Eastern Railway to revise its timetables extensively. There are now 22 additional electric local trains running in and out of Howrah. Through express passenger trains are scheduled to run over the bridge to Barauni on the Ganges north bank, where connection is made with the North Eastern and North East Frontier metre-gauge systems. They will run from Howrah, Sealdah and Dinapur, and a shuttle service between Barauni and Mokameh connects with main-line trains at the latter station. An innovation is the extension of the Sealdah-Delhi express to Pathankot, one of the extreme northern termini of the Northern Railway not far from the Kashmir border.

60-ton Bogie Mineral Wagons

As existing 22-ton 5 ft. 6 in. gauge standard four-wheel steel mineral wagons are quite inadequate both in number and capacity to cope with the phenomenal increase in the iron-ore, coal and similar traffic, the Research, Design & Standardisation Department of the Railway Board

Photo] [*Guy Bakewell*

Stock train crossing the bridge over the Hume Reservoir between Huon and Tallangatta, Victorian Railways

has designed a new all-welded 60-ton bogie wagon. Construction of four prototype vehicles of this special design is being carried out at the State-owned Perambur Integral Coach Factory, near Madras. Hitherto only all-welded lightweight passenger coaches have been built in that plant.

Doubling of Delhi-Rewari Section

Of the 30 miles of partial doubling on the Delhi-Rewari section of the Northern Railway metre-gauge system, 23 miles between Delhi Sarai Rohilla and Garhi Harsaru have been opened for goods traffic. The seven-mile portion between Khalilpur and Rewari was recently due for opening for goods traffic. The entire section is expected to be opened for passenger traffic by the end of the year.

Diversion of Bombay-Delhi Line

As a result of the projected construction of the Penasa Dam in the State of Madhya Pradesh, there is every likelihood that the Khaigaon-Piplani section—between Khandwa and Itari—of the Central Railway main trunk line between Bombay and Delhi will have to be diverted. Preliminary arrangements are already in hand. As the Narbada River flows roughly parallel to this section of of the railway and from 15-20 miles to the north of it, it is presumably the damming of this river which is projected, with the immersion of the existing line.

Duplication of Transport Facilities

Addressing the National Railway Users' Consultative Council in New Delhi the Railway Minister, Mr. Jagjivan Ram, stated that there was some misapprehension in certain quarters that the railways wanted to curb the development of road traffic. In the present stage of development of India, he added, there was scope for the development of all modes of transport. Care had only to be taken that limited resources were not spent with resultant incomplete use of the capacity available in one or other mode of transport.

UNITED STATES

"Springfield Special" Withdrawn

The Illinois Central Railroad has withdrawn the "Springfield Special" which operated between Springfield, Illinois, and Chicago. Approval to discontinue the train was granted by the Illinois Commerce Commission.

The "Springfield Special" was placed in service in October, 1958, on a trial basis following consolidation of the Illinois Central's Chicago-St. Louis service. Despite every economy made in the operation of the train revenues from passengers failed to cover even out-of-pocket operating costs. The loss in the nine months the train was in service amounted to $82,000.

New York Central Seeks U.S. Loan

The management of the New York Central is seeking a Government guarantee for a loan of $40,000,000 which eight insurance companies have agreed jointly to provide at 5 per cent interest. The money, if obtained, will be used solely for capital improvements, and therefore will not preclude the normal payment of dividends while it is still outstanding. For these improvements $20,000,000 will be required also from other funds.

The plans are for an "automated" marshalling yard at Indianapolis, work on which has begun already. It will replace seven existing yards. By an expenditure of $12,000,000 here it is hoped to save $2,900,000 annually. Two other such yards and nine major installations of electronic traffic control also are in view. Further savings are to be effected by replacing the present large passenger stations at Albany and Syracuse by smaller stations at Rensselaer and East Syracuse respectively, the existing premises being sold for other uses. Here also an annual saving of $1,000,000 in costs and taxes is expected.

Average Wagonloads

During 1958 the average load carried in wagons in the U.S.A. was 43·5 tons (38·8 tons of 2,240 lb.) compared with 43·8 tons in 1957. The decline was caused by a decrease of 2,400,000 in the number of wagons loaded with coal, ore, and other minerals, and not by any decrease in the average loading of individual wagons. The average loading of mineral wagons rose from 60·1 to 60·6 tons, the heaviest on record, and other records were set by an average of 38·9 tons in wagons carrying agricultural products, 38 tons in those carrying forest products, and 15·3 tons in those carrying animals and animal products.

AUSTRIA

Vienna Nordbahnhof

On May 31 traffic was resumed after 14 years, on the line north-west and north across the rebuilt bridge over the Danube the Nordbahndonaubrücke, to Vienna Nordbahnhof and Hauptzollamt stations. Certain trains of the old Pressburg and Aspang lines now leave from and arrive at the Nordbahnhof, which is still being rebuilt.

HUNGARY

Supply of Railway Materials to Chile

Senor Angel Ferovarich, chairman of the financial committee of the Chilean Senate, recently visited Budapest in connection with the promotion of trade between Hungary and Chile. He expressed the hope that Hungary would find a market for railway materials in Chile.

Publications Received

L'Année Ferroviaire, 1959.—Paris 6e.: Librairie Plon, 8, Rue Garancière. 9 in. x 5¾ in. 280 pp. Illustrated with photographs, maps, and diagrams. No price stated.—The 13th of these annuals is divided into two parts, as in previous years. The articles in the first part include a description by Monsieur H. Rousselier, of the French Ministry of Finance & Economic Affairs, of the part played by the French locomotive, rolling stock, and allied industries in export trade. The article is illustrated with photographic views of motive power and rolling stock supplied to railways in other countries, and a list of the principal orders completed in 1952-57. Monsieur J.-M. Goursat, General Manager of the Northern Region of the French National Railways, contributes an article on the Paris-Lille electrification recently completed in his Region. The application of electronics to railways, with special reference to the S.N.C.F., is the subject of a survey by two S.N.C.F. chief officers, Monsieur Robert Lévi, Directeur des Installations Fixes, and Monsieur Camille Martin, Directeur du Matériel et de la Traction. Monsieur J. Mothes, Principal of the Institut National de la Statistique et des Etudes Economiques, and Chief of Operational Research, S.N.C.F., gives details of operational research methods applied to the French National Railways. The second part consists of a statistical review of the S.N.C.F. in 1958, and some of the world's principal railways, with chapters on technical developments in France. The information is well presented and of considerable value for reference. The many photographs are well chosen and reproduced.

Railway Tyre Heating Plants.—Leaflets produced by Selas Gas & Engineering Co. Ltd., describe gas-fired and oil-fired railway tyre-heating plants designed for minimum installation cost and maximum versatility in use. A single plant of this make for expanding and shrinking on new and for removing old tyres is shown to be adjustable for varying diameters. The arrangement permits expansion limits to be gauged in the heating position. Full details given include recommendations on the quantity of firing and auxiliary combustion chamber units required for specific heating conditions. Oil service tanks, combustion air blowers, and other accessories also are illustrated. Copies may be obtained from the Selas Gas & Engineering Co. Ltd., Selas Works, City Road, Manchester, 15.

Holidays Overseas, 1959-60.—Thos. Cook & Son Ltd. and Dean & Dawson Limited, published last month their admirably produced illustrated programme of holidays in several continents, available for residents in Britain who wish for a respite from the British winter climate. The 50-odd pages give particulars of tours in the Belgian Congo, Canada, Chile, Egypt, India, New Zealand, Rhodesia, the Union of South Africa, and the U.S.A., during all of which there are journeys by train, sometimes by day through scenery of great beauty or surroundings of particular interest. A 12-week holiday, of which half is spent in India, includes travel in air-conditioned accommodation in the "Punjab Mail" from Bombay to Delhi, and in the through mail train from Calcutta to Madras. The tourist in Chile can make the fascinating train journey from Puerto Varas northwards to Santiago.

Upminster Railway Depot, London Transport Executive

New £1,000,000 Maintenance depot completed for the District Line

General view of the depot at night, showing the car examination shed, left, the lifting shop, centre, and stabling sidings, right. The second lighting tower is in the background

THE London Transport Executive railway depot at Upminster, District Line, has now been brought into full service. Upminster Depot is the first completely new depot to be built for the Underground since the war and has cost £1,000,000; it will take 34 eight-car trains. The depot was opened on December 1, 1958, for operating purposes and day-to-day cleaning and maintenance of trains, but not for heavy maintenance work. The new 215-ft. lifting shop has now been completed and fitted with modern equipment and full maintenance work is now being undertaken.

The new depot, which is the only Underground depot on the east side of London serving the District Line, replaces inadequate facilities previously provided at East Ham Depot, the site of which was required by the Eastern Region of British Railways in connection with its own modernisation programme, and at Upminster.

The depot, on which work started on May 1, 1956, has three reception roads leading to 13 sidings capable of taking 25 trains, a car shed with nine roads, a lifting shop with two roads, and three permanent way sidings. There are washing machines on two of the reception roads, and all roads in the car shed and lifting shop have pits.

Originally, as the depot is single-ended, it was intended that most of the stabling roads should take only one train, a wide fan of sidings being provided for the purpose. In the interests of economy, however, the fan was closed up and the sidings lengthened so that two trains can be stabled on each road. This can mean that on rare occasions trains, which otherwise could enter service, can be blocked, but savings in initial cost and daily track maintenance have been achieved. Also, the closing up of the fan made it possible to reduce the number of approach or reception roads from Upminster Station from four to three. Space, however, is available for more sidings should it become necessary to accommodate additional trains on the District Line.

Staging of Work

The construction work was divided into four stages, a preliminary stage followed by stages 1, 2, and 3. This staging was so arranged as to enable the normal number of trains to be stabled at Upminster throughout the work. The preliminary stage consisted of laying a fan of seven sidings, each taking two trains, in its final position and providing a temporary connection to the single existing reception road. Eleven train berths were electrified, nine to replace the existing berths, one for shunting purposes, and one for use by the Permanent Way Department for equipment purposes.

The earthworks for the eastern end of a new reception road and the base for its washing plant were put in hand at the same time, as were the construction of a sixth platform at Upminster Station and the first stage of a new subway to replace the former footbridge carrying a public footpath between Deyncourt Gardens and Howard Road across the site. (The sixth platform at Upminster Station is used by the Eastern Region of British Railways for the Upminster-Romford diesel-operated shuttle service.) This preliminary stage was followed by stage 1, which started with the removal of the old sidings and then excavation and drainage for the second new fan of six double-length sidings and the western ends of the other two reception roads.

During this stage, work was begun on the excavation and concreting of the car shed inspection pits, which are of mass concrete. Towards the end of the stage, tracks were laid in the second siding fan and the eastern end of the first reception road was laid over the completed portion of the subway and the washing plant base, ending in a temporary connection to the old reception track. The existence of this temporary connection made it possible to bring the second fan of sidings into use, the first fan then being handed over to the Permanent Way Department for fettling.

In stage 2, the eastern end of the old reception road was removed, the embankment was widened and the second half of the subway completed, and the second and third reception roads were laid between the station and the depot. Also in this stage, large-scale filling operations in front of the car shed were completed, followed by the laying of the car shed approach tracks leading to the inspection pits, which by then were ready to have the rails installed. At Upminster Station, platforms Nos. 3 and 4 were shortened. A scissors crossover was laid in between two of the reception roads.

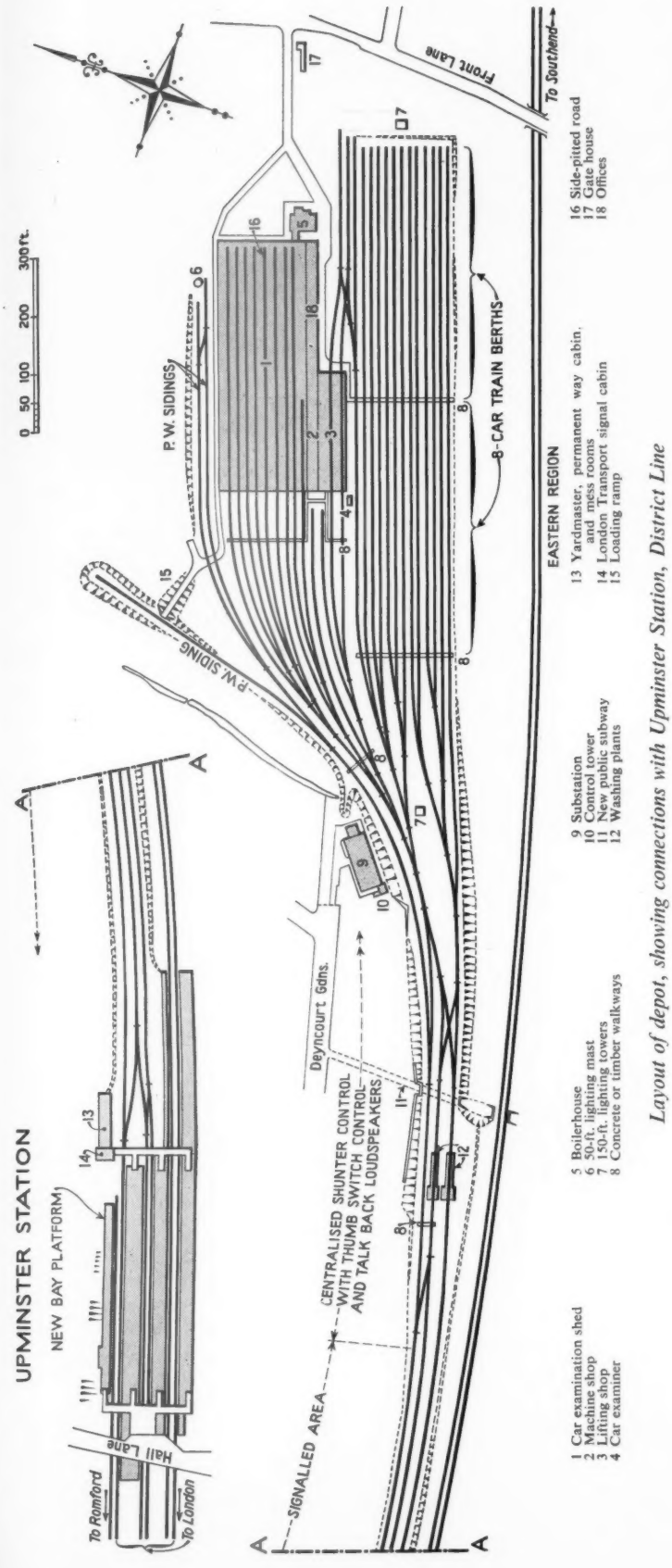
In stage 3 traffic was diverted to the second and third reception roads while work on the western end of the first reception road (which had had the temporary connection) was completed and the superstructure of the first train washing plant was built. At this point, the depot buildings and service road had also been completed and the depot was brought into use on December 1, 1958, for the trains previously dealt with at East Ham.

There remained the erection of the second washing plant and the installation of overhead lifting gear and machine shop equipment in the lifting shop, all of which has now been completed.

Construction of Buildings

The car examination shed, 450 ft. in length, consists of nine roads, eight of full length capable of taking an eight-car train completely over the pits, and a short pitted road taking three cars. Because the work at Upminster is mainly cleaning and examination and not detailed inspection of equipment, one pit road only is provided with side pits. These side pits are used when detailed equipment examination is necessary, but this work is normally undertaken, on the District Line, at the main depot at Ealing Common. The curtailment of one road to three-car length enables an adequate circulating area to be provided at the side of the staff accommodation.

Overhead conductors, carrying small trolleys with jumper cables to provide power to trains, run the full length of the



Layout of depot, showing connections with Upminster Station, District Line

pits, as there are no conductor rails inside the car shed. The connectors on the jumper cables are inserted into receptacle boxes on the cars when power is required. This is the standard practice at London Transport depots. The shed has pit heating, an innovation at rolling stock depots. It is single-ended and power-operated shutters are fitted so that heat loss is reduced to a minimum when trains have to enter or leave the shed.

The lifting shop, adjoining the examination shed, is 215 ft. in length. It was brought into use on June 29, 1959, when, for the first time, accommodation for the lifting of cars became available at the eastern end of the District Line. This avoids the inconvenience of working defective empty trains back to the main depot at Ealing Common.

Although the general arrangement at the depot is single-ended, the lifting shop is double-ended so that any one of the four cars which can be lifted can be extracted from the shop without interfering with work in progress on the other three cars. The shop has two roads with centre pits running their full length. Each road is long enough to contain two cars with both bogies of each car out and still give space to work on them. The cars are lifted by an overhead 15-ton travelling crane. The support blocks for the car body when clear of the bogies incorporate a pair of wheels to enable them to be moved easily about the shop.

To avoid the installation of overhead trolley leads in the crane bay, the usual method of supplying power to the cars has been replaced by two pedestal-mounted jumper receptacles, one at each end of the shop between the two roads. Trailer cables are provided when power is required. The fitters' benches and machines for repair of components are housed in a machine shop bay. Machine tools include a power saw, radial drill, and double-headed grindstone. There is also a small sub-store for small components.

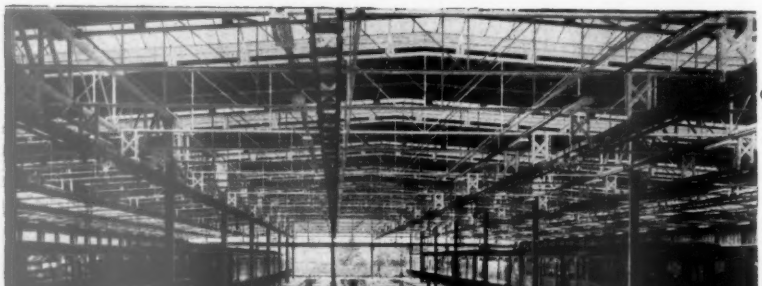
The offices, mess rooms, locker room, and lavatories, are in a long line on the south side of the car shed and form the southern side of the shed.

Oil-fired Heating

The main buildings are heated by oil-fired thermostatically-controlled boilers in a boiler room at the east end of the depot buildings. In the car shed, only the pits are heated, but in the lifting shop hot water radiator panels are fitted along the walls at low level and there is a Copperad panel system at high level in the roof.

The car shed and lifting shop are steel-framed buildings with continuous patent glazing to the sides and ends of the main sheds with Universal Twin Twelve asbestos sheeting above, insulated in the lifting shop but not in the car shed. The west end of the car shed and both ends of the lifting shop are fitted with electrically-operated roller shutters.

The roof is a departure from those at other London Transport railway depots in that it has single tubular steel trusses across the whole 150-ft. width of the shed, with two intermediate supports, instead



Interior of car examination shed, showing side-pitted road in the centre, and jumper cables for supplying power to trains within the shed

of three separate trusses with valley gutters. The roof lights also span across the width of the building instead of running longitudinally, and have felt-covered timber walkways for maintenance purposes on all sides. Longitudinal mansard glazing is provided at eaves level at each side. The lifting shop roof also has tubular steel trusses in one span (52 ft.) but has a longitudinal ridge light with adjustable opening sections with a walkway all round and mansard glazing. The roof is covered with insulated sheeting.

The car shed and machine shop are fitted with continuous troughing for fluorescent lighting fittings, but the lifting shop has combined tungsten and sodium fittings. The offices have fluorescent lighting, and fluorescent lanterns on steel masts light the roadways round the depot buildings.

Apart from the main depot buildings, there are three associated buildings or structures; the new substation and adjoining shunting control tower; the signalbox, relay room, and yardmaster's office at Upminster Station; and the train-washing machines.

Substation

The single-storey substation is situated at the west end of the depot, where the reception roads split into the fan of sidings. It is of the unmanned type controlled remotely from Heathway Control Station, and provides power supplies for the various electrical services in the depot. In addition to the existing depot loads, it is also designed to take over, at a later date, the present functions of Upminster Bridge Substation and provision has been made in the building to accommodate the additional equipment which will be required for this purpose.

Supply to the substation is brought in at 11 kV. over a duplicate cable circuit from Heathway Substation and connects to the HV switchboard via truck-type oil circuit breakers rated at 250MVA. Truck-type breakers of the same rating distribute the supply to the various equipments. Metering and protection equipment associated with the HV board are mounted on a separate panel.

Direct current supplies for traction and other purposes are given at 630 V. d.c., from two 12-phase steel-bulb mercury-arc rectifier units each rated at 1,500 kW. To accommodate the additional load from Upminster Bridge Substation, the present installed capacity of 3,000 kW. would be increased to 6,000 kW. by the addition of two similar sets.

Each complete 12-phase 1,500-kW. unit consists of two separate self-contained 750-kW. half units each comprising a six-phase 750-kW. Class III fan-cooled rectifiers fed from a three/six-phase 11-kV./582-V. transformer cooled on the air-to-air principle by a closed air circuit cooling system.

The d.c. switchboard comprises a single-line arrangement of truck-type units mounted side by side and divided into positive and negative sections by a central double-door cubicle containing a static test panel for local testing of the truck units. The positive section of the board is equipped with high-speed circuit breakers rated at 3,000 A., and the negative section with contactors of the same rating which operate in unison with the high-speed circuit breakers through electrical interlocks. Dummy unequipped panels are installed in each section for anticipated future equipments.

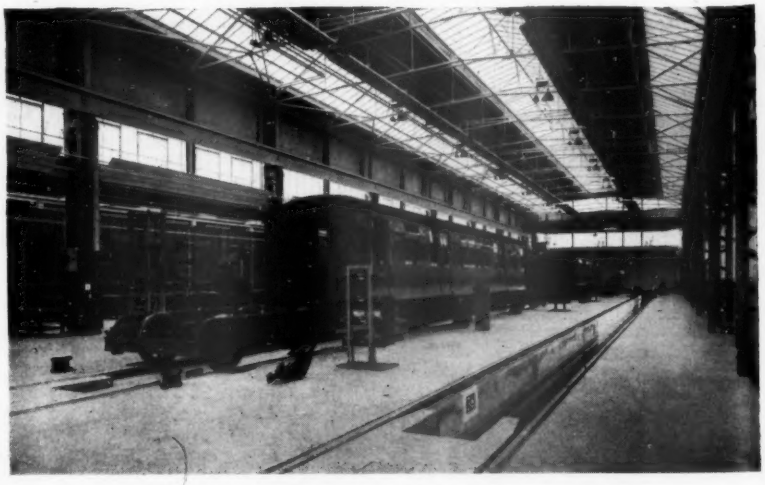
At present the board serves five outgoing circuits, three for traction purposes, one for the depot trolley system, and one for the depot workshops. The high-speed circuit breakers controlling these circuits are interchangeable and each is fitted with a rate-of-rise tripping feature which enables the breaker to be closed on to the heavy standing loads which occur frequently during winter months.

Lighting and Heating Supplies

Supplies for lighting, heating, and other a.c. services are given from an 11-kV. 415-V. 500 kVA. oil-cooled outdoor transformer and are distributed from an auxiliary switchboard via hand-operated fused switch isolators. Current for signalling purposes is delivered at 33⅓ cycles single-phase from two specially designed motor/generator sets, one for normal working and one as standby. Two supplies are given, one at 440 V. for track-circuiting equipment and one at 600V. for signal circuits.

Each set comprises two single-phase alternators having individual outputs of 440 V. 15 kVA., with a leading power factor and 600 V. 35 kVA. with a lagging power factor driven by a central three-phase 415-V. on-line induction motor to which they are coupled by adjustable vernier connections. Angular adjustment of these couplings enables the two voltage vectors to be displaced relatively at any required angle. The sets are equipped with specially designed control apparatus which enables them to operate as automatic self-regulating units and facilitates smoother transference of load when paralleling is effected.

Two lead acid batteries complete with chargers give supplies at 110 V. d.c. for switchgear-closing purposes and 50 V. d.c. for switchgear tripping. These supplies are distributed via fused switch isolators



Lifting shop, showing work in progress on two cars

from a separate battery distribution switchboard.

Compressed air for signalling purposes is supplied from two electrically-driven water-cooled compressors, one working and one standby, which are housed in the separate compressor annexe at one end of the building with a similar set supplying air for general depot usage. Each compressor has a capacity of 100 cu. ft. per min. at 125 lb. per sq. in. Water is extracted from the compressed air in two stages by a new method. The air is compressed to 125 lb. per sq. in. instead of the usual 70 lb. per sq. in., and after leaving the compressor is first passed through an after-cooler unit where it is cooled to a temperature slightly above ambient and the primary water content condensed out, the coolant being water in a closed circuit with forced draught cooling.

From the after cooler the air passes to an air reservoir and then to the usual outdoor cooling grid. The air then passes through an expansion valve which reduces the pressure to the normal operating value of 70 lb. per sq. in. This sudden expansion results in the dew point being reduced to a temperature lower than freezing point with a consequent reduction of the likelihood of signal equipment failures due to the freezing of water in the compressed-air system.

Shunting Control Tower

At Upminster, London Transport has introduced a different method of working of trains into and out of the sidings. At other depots, it is the practice for shunters to hand-operate the points, and trains are hand-signalled from the ground. The method adopted at Upminster is that control of all the points, which are power operated, is provided from thumb switches in the shunting control tower and the shunter gives instructions to the drivers by means of loudspeakers.

Track circuits are installed throughout the depot and give the usual illuminated indications on the track diagram. The equipment, however, is not of a full signalling standard, but much cheaper apparatus and cabling has been used. The track circuits are a.c. fed to the track rails, but Post Office 3,000 telephone-type relays are used in conjunction with a rectifier as the track relay.

Control tower and substation

Shunters console in the control tower, showing thumb switches for point operation and buttons for individual loudspeakers

The point operating equipment comprises a simple compressed-air cylinder, which operates the point switches direct, and no provision for locking is made. Electrical detection is, however, provided on the points.

The loudspeakers are arranged to give a " talk back " facility. For this purpose, a large number of small loudspeakers placed close to the ground are used, and they are situated so as to be close to the front of a train, the driver of which is to receive instructions. The loudspeakers are switched in, one at a time, by pressing a button on the track panel, and speech is heard only from the one loudspeaker switched in. The shunter in the control tower gives instructions to the driver, and, on releasing the button, the loudspeaker automatically switches over to function as a microphone. The driver then acknowledges the message by leaning out of his cab and speaking in the direction of the loudspeaker. The sound is picked up by the loudspeaker, amplified and reproduced on a loudspeaker in the control tower. This system functions to give the drivers instructions to move their trains, and takes the place of the usual fixed signals.

Emergency Warning Lights

A few emergency red lights have been installed. The intention with these lights is that, if the shunter should hear more than one driver acknowledge his message, or a confusion of acknowledgments, by pressing a switch he lights up a red lamp which can be seen by any of the drivers. According to the instructions given, all trains are brought to rest if the red lamp is lighted. This lamp comprises a 500-W. bulb, fixed behind a prismatic lens of the ship's lantern type, giving a wide spread of light.

The control tower is a four-storey brick building, attached to the south west corner of the substation, the actual control tower forming the topmost floor. It has wide windows to give the shunter observation of all the train movements under his control.

Walkie-Talkie Apparatus

In addition to the regular service drivers taking trains into service, a shunter-driver is employed in the depot for moving trains from siding to siding, or into the sheds, as required. To maintain constant communication between this man and the control tower, v.h.f. radio is provided. The shunter in the control tower has a 3-W. radio transmitter and receiver, operating from an aerial mounted on top of the tower. The shunter-driver carries a walkie-talkie set and this provides instant communication with the control tower at any time.

Trains leaving the depot to proceed to the main line are shunted into the reception roads by the shunter, and at this point come under the control of the normal signalling, with full signalling safeguards, worked by the signalbox at Upminster Station.

Lighting of the Depot

Lighting of the outside tracks in the depot is carried out from two lighting towers, one situated at each end of the fan of sidings. These towers are 150 ft. high, and the easternmost tower carries 10 1,000-W. floodlights, whilst the tower at the west end of the depot carries 21 1,000-W. floodlights. Fluorescent lighting or mercury blended lighting is used in the car sheds. Fluorescent lighting is also used for a row of lamp posts lighting the walkway from the station to the depot. The lighting of the depot is controlled from a single switch panel situated in the shunter's tower.

The cables connecting to the current rails, and also forming jumpers joining gaps in the current rails, are all of the neoprene ribbed type that is becoming standard throughout the London Trans-

Upminster Station Signalbox and accommodation for the yardmaster and permanent way staff

port system. These cables are all finished with a vulcanised metal-to-rubber bond at the rail end of the cable, to seal them against the ingress of moisture. They have the advantage of requiring no troughing or other protection against damage. They are, however, covered at one or two places where there are regular walkways, to avoid staff stumbling over them.

Washing Machines

Nearer Upminster Station, on the two southernmost of the three approach roads to the depot, are two train-washing machines equipped with both vertical and horizontal flails. Their position on the approach roads makes it possible to wash trains on their way into the depot, so that no special shunting movements are required, once the train has been stabled, for train-washing purposes. Because the same roads are used by trains leaving the depot, arrangements have been incorporated to enable the washing flails to be retracted clear of the tracks to give the trains clear passage on their way towards the station. Illuminated signs show " Clear " when the flails are retracted or " Washing " when in use.

At the east end of Upminster Station is a new building which combines accommodation for the Yardmaster and Permanent Way Department with a signal cabin and accommodation for Signal Engineer's Department linesmen. This is a two-storey block with the relay room at the station end. The signal cabin is in a high position above this room giving the signalman a good view of the track in both directions. The signalling at Upminster Station is carried out by two interlocking machines, one installed in the relay room below the signal cabin and the other in a separate machine room at the west end of the station.

The signal cabin itself has a push button desk and illuminated diagram. The push buttons operate on the route principle and full facilities for pre-selection are provided. The buttons are of the internally illuminated type used at a number of other installations on London Transport, and serve as an indication of the signal, either at danger, clear or pre-selected.

The signalling equipment is run at 33⅓ cycles, to provide a differentiation from the 50-cycle electrification which will later on be used on the adjacent Eastern Region tracks. The track circuits are fed from a separate signal supply, also at 33⅓ cycles.

Upminster depot has been built to the requirements of Mr. A. W. Manser, Chief Mechanical Engineer (Railways), London Transport. The civil engineering, signalling, lighting, and heating work was planned in the civil engineering and signalling offices of London Transport under Mr. C. E. Dunton, Chief Civil Engineer. The architectural work was under the supervision of Mr. T. R. Bilbow, Architect, London Transport. The electrical substation was equipped to the requirements of Mr. T. S. Pick, Chief Electrical Engineer, London Transport.

The principal sub-contractors are as follow:

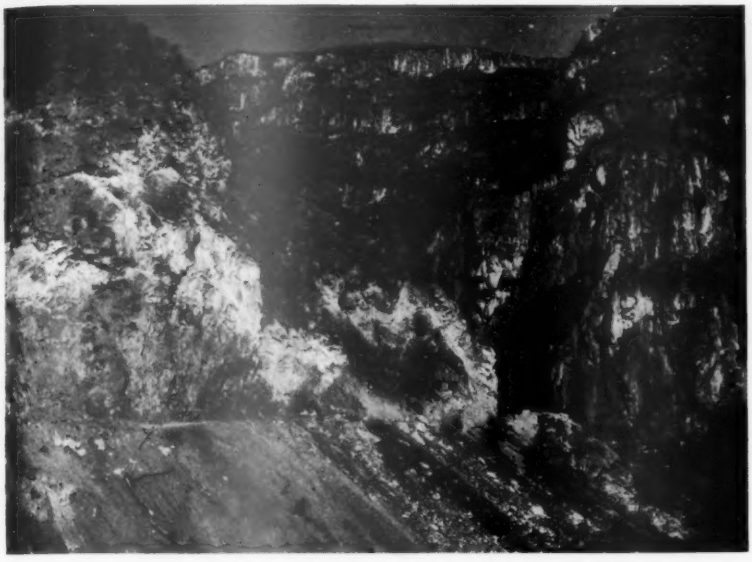
Civil engineering work...	Holland & Hannen and Cubitts Limited
Building work	Tersons Limited
Rectifiers, transformers, and switchgear	English Electric Co. Ltd.
Motor generator sets for signal supplies	Brush Electrical Engineering Co. Ltd.
Compressor sets ...	Broom & Wade Limited
Compressor control equipment	Allen, West & Co. Ltd.
Batteries	Pritchett & Gold Limited
Battery chargers ...	Westinghouse Brake & Signal Co. Ltd.
Motors and reducing gear for washing machines	Opperman Gears Limited
Electrical control equipment for washing machines	Airedale Electrical & Manufacturing Company
Pumps	Gwynne Pumps Limited
Valves	Saunders Valve Company
Machine shop electrical distribution	Power Centre Co. Ltd.
15-ton E.O.T. crane ...	Wharton Crane & Hoist Co. Ltd.
Lighting towers ...	Pirelli-General Cable Works Limited
Signalling material ...	Westinghouse Brake & Signal Co. Ltd.
Signalling cables ...	British Insulated Callenders Cables Limited / General Cable Manufacturing Co. Ltd.
Ribbed neoprene cable...	W. T. Glover & Co. Ltd.

British Railways Main Line Diesel Operation

Kings Cross-Leeds passenger train hauled by the 3,300-h.p. English Electric Co. Ltd. " Deltic " locomotive approaching Hadley Wood Station, Eastern Region

Modern Railway Construction in Mexico

Tunnelling and other work in 60 miles of nearly continuous rock



Approach to one of the tunnels, showing rock cutting and spoil forming embankment

FOR many years past a standard-gauge trans-Mexican railway has been planned and partly built. Its objective is to connect the Pacific port of Topolobampo on the Gulf of California with the State capital of Chihuahua and the United States frontier at Presidio, Texas; the overall distance is 952 miles.

Construction began in 1904 and by 1910 783 miles had been completed when economic conditions made further progress impossible. These 783 miles are not continuous but are partly at the north-east end of the through route and partly at the south-west end from the Pacific coast. The northern part extended and extends from the Texan border through Chihuahua to La Junta and Creel near Sanchez in the State of Chihuahua, and the southern part connects Topolobampo with San Blas and Hornillos in Sinaloa State. These two parts are still the only open-line sections of the whole trunk route, known as the Chihuahua-Pacifico Railway, with a gap of 160 miles between them from Creel to Hornillos. A railway to span this gap was obviously going to be very costly as much of it would be through the Sierra Mountains an almost impenetrable area, so rough and precipitous that as subsequent construction has proved nearly 90 per cent of the excavation is in solid rock. This no doubt helped to make the Mexican Government hesitate to continue construction in 1910.

Constructional Standards

It was not until 1954, in fact, that the Government decided to proceed with the work and complete the through route. As might be expected in such difficult country it was necessary to allow as standards for the construction of the 160-mile connecting link a ruling gradient of 1 in 40 and 8-deg. or 11-ch. curves and a 20-ft. formation width.

Contracts for the construction were awarded to two Mexican contractors. That for the western 90 miles from Hornillos was let to a firm known as Cagsa, who also undertook the rehabilitation of the Topolobampo-Hornillos open-line section and had experience in the building of two important dams in this area. Cagsa is recognised as one of the most experienced civil engineering constructional firms in Mexico. The remaining 70 miles were entrusted to a firm of contractors, ICA.

About 60 miles of Cagsa's 90-mile contract length are in the Sierras, and one of that firm's greatest problems was the construction of pioneer service roads to carry the heavy construction plant. In fact, of the 4,500,000 cu. yd. of excavation involved in this contract some 500,000 cu. yd. were required for building these service roads, nominally 13 ft. wide and mainly benched out of the mountain-sides. For their construction Cat D.8 tractors were used to carry compressors and jackhammers piggy-back, and five large shovels proceeding partly under their own power and partly towed by tractors.

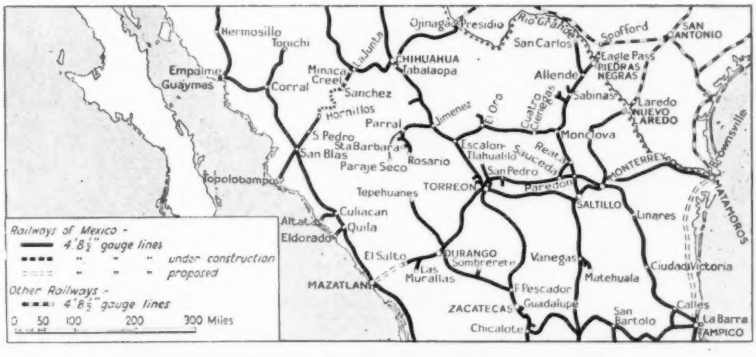
The Cagsa contract length is divided into two sections, and in the lower or western section one of the first major works noted by a correspondent who traversed the whole contract length, was a bridge over the Septentrion River, a rushing torrent. Formation beyond is benched out of the rocky mountain-side leading to No. 1 tunnel, which will be the longest of large bore in Mexico when completed.

The exceptionally good progress so far made in the excavation of this tunnel is attributed largely to the use for the first time in Mexican tunnelling of 42-lb. Swedish Atlas drills as opposed to the heavier and less efficient ones previously used. At the heading they are mounted on a jumbo frame—three in front, two at each side and five underneath—and are worked by air supplied by Gardner-Denver compressors situated outside the tunnel-portal.

Tunnelling Methods

One "round" of the operations of connecting up, drilling, blasting, mucking and loading is completed in an average time of 3 hr. Work proceeds in two shifts in each 22-hr. day during which seven rounds are completed. An Eimco front-end loader discharges the muck into three Koehring Dumptors which carry it through a cut and across a road to discharge down the mountain-side. Ventilation in the heading is provided by three blowers at the tunnel-portal through 20-in pipes; one of the blowers acts as an air-extractor.

The average explosives charge required to blast a cu. yd. in the tunnel is 40 lb. of gelatine dynamite, but in cutting excavation the charge per cu. yd. is 12 oz. Safety is stressed in the tunnel work and as a result no serious accidents have



Northern Mexico, showing line under construction

Solid rock tunnel portal, showing portable ventilating plant and compressor

so far occurred. A remarkable feature in this tunnel is the virtual absence of water seepage.

Cutting Excavation

In a typical cutting a Cat tractor was pushing the rock muck within reach of a 2½-yd. Bucyrus-Erie 54-B shovel which was scooping it up and discharging into two Euclid 80-Bs for removal and dumping into the valley. Meanwhile, rock-drillers were scrambling hand-over-hand up the 115-ft. rock cutting face with the aid of a rope and carrying 52-lb. drills strapped to their waists.

At another point where a tunnel had originally been planned the proximity of the alignment of the railway to the edge of the cliff and the peculiar formation of the sedimentary rock had necessitated the substitution of a cutting up to 125 ft. high and involving the excavation of 65,000 cu. yd. of rock. A short distance from this cutting the line follows a ravine about 100 ft. above the Septentrion River and crumbling rock made it necessary to build long and high retaining walls. In this mountainous area embankment-slopes are normally limited to ¼ or ½ to 1. The next prominent feature of the work in hand was a second tunnel at El Tigre and a third is to be constructed between there and La Cruz.

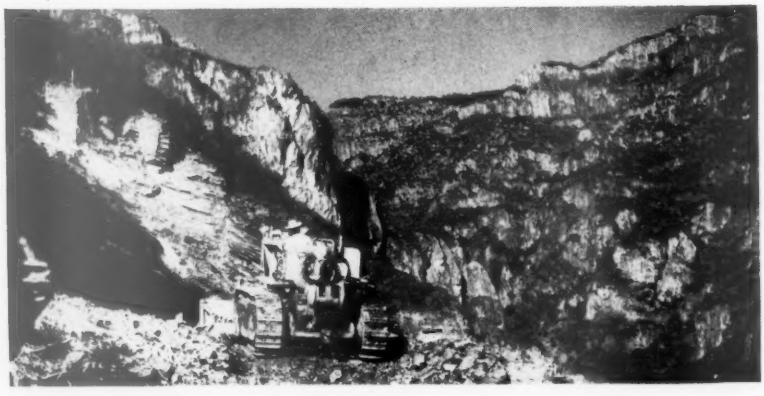
Plant and its Maintenance

The efficient Cagsa organisation, with headquarters in Mexico City, lays special stress on mechanisation and thorough-going upkeep of its plant. The portable machines on this job include 20 Cat tractors; four Manitowoc shovels; a 1½-yd. Bucyrus-Erie 38-B shovel and a 2½-yd. 54-B shovel; 150 Atlas and Gardner-Denver rock drills; 27 compressors, including five Gardner-Denver 900s, four 365s. and several Chicago pneumatic compressors; 20 Koehring Dumptors; 12 Euclid 80-Bs; seven Eincos; three rock crushers, three Rex concrete mixers; 28 dump trucks; 13 Land Roller jeeps, and 15 Lincoln welders. There are also the jumbos and other less-mobile machines. As may be expected in such precipitous country casualties are not uncommon and special attention is paid to repairs and replacements. Near Mexico City the firm has repair shops covering two acres where the number of machines usually seen under repair or periodic check runs into three figures. Also in the vicinity of that city it has extensive stores housing surplus new and used machines and spare parts. Should a machine on the work in the Sierras fall down a ravine, a radio message is sent forthwith to Mexico City and within half an hour of its receipt a replacement is on its way.

In the field also meticulous methods are in force to insure continuity of work practically round the clock. Every night a crew of specialist mechanics inspects every working unit and as a result, for instance, of six shovels—none of them less than six years old—that had been working steadily for 10 months only one

(*Continued on page* 244)

Manitowoc shovel working on a narrow ledge using cutting spoil as fill



Cat D8 tractor moving rock on the edge of a precipice

Detectors for Accident Prevention

Electrical devices for the detection of dragging equipment, hot axleboxes, and adverse weather conditions

(By a correspondent)

Broken flange and loose wheel detector

APART from preventive maintenance and routine inspection, accidents are reduced to a minimum by special vigilance at places where these are likely to occur. This is especially so in countries where extreme weather conditions are experienced. In tropical countries, where heavy monsoons quickly bring rivers to a flooded condition, bridge guards are posted for the rainy season and their function is to give warning, or stop an approaching train, should the bridge be endangered by rising water. Where heavy snowfall is experienced, patrolmen warn trains where snow or fallen boulders blocks the line.

In the U.S.A. observation of these conditions, bridge fires, and train with hot axleboxes or dragging equipment, has become difficult in recent years due to long stretches of railway with crossing stations operated from a central point by Centralised Traffic Control. The stations are often completely unattended and there is nobody present to observe and report conditions on a train, which may lead to an accident. This has led to the development and introduction of a number of devices designed to detect hazardous conditions.

Dragging Equipment Detection

Brake beams, or other loose equipment, when hanging or dragging from carriages or locomotives, may cause derailments. A number of devices have been introduced to detect these defects. A series of brittle, cast-iron loops are mounted between and outside the rails, just below standard clearance for rolling stock. Hanging parts break one or more of the detector loops and these being connected in a detector circuit de-energise a relay and operate warning devices. Another type of dragging equipment detector consists of sheet metal panels bolted to a horizontal shaft mounted on bearings between two sleepers so that the top edge of the panels is about level with the tops of the rails. When dragging equipment strikes one of the panels, the shaft is rotated a few degrees operating a circuit controller.

Dragging equipment is most likely to cause derailment at switches where turnout rails may deflect the loose parts under the wheels. The detectors are placed at approaches to interlockings which have numerous switches and cross-overs: also at important bridges and tunnels where a derailment might cause serious damage and perhaps block the line. Over 800 sets of these detectors have been installed on the railways of the U.S.A. and some have used these detectors as part of wagon inspection facilities in gravity classification yards.

Goods wagons with broken flanges on their wheels have caused serious derailments. These defects are difficult to find even when a wagon is standing in a yard. A device that automatically detects broken wheel flanges as well as wheels that are loose on the axle, while wagons are in motion, has gone through several years of development.

Each detector consists of a series of spring steel fingers, at right angles to the rail with an insulated, hardened steel pad near the end of each finger. The upturned end of each finger extends $\frac{3}{4}$ in. above the top of the rail. The flange of a normal wheel encounters the insulated pads thus pressing the upturned fingers away from the tread of the wheel. If a section of flange is broken away, the contacting finger tips touch the tread and make contact to a relay circuit and warning devices.

The device also detects a loose wheel if it fails to stay on the insulated pad. Each detector is 11 ft. 6 in. long which is longer than the circumference of a 42 in. wheel. The detector functions at train speeds up to 20 m.p.h. When the detector discovers a defective wheel, an automatic pump sprays yellow paint on it and an alarm is sounded. Since these broken flange detectors have been installed a large number of defective wheels have been revealed and presumably serious accidents prevented. The detectors can be damaged by gear hanging down from rolling stock and the practice is to install dragging equipment detectors in advance of the broken wheel detectors.

Hot Box Detector

Another device recently introduced is the hot box detector. This device has proved that the principles employed have been most successful in detecting hot axleboxes in a reliable and practical manner. The equipment used in this system was designed by a firm who are manufacturers of infra-red control systems for industrial purposes. For a number of years industries such as steel mills have used electronic devices known as intra-red pyrometers to detect infra-

Self-restoring dragging equipment detector

Hot-box detectors on each side of the track

red rays being emitted from heated metal and thus measure the temperature although the pyrometer may be 10 or 15 ft. away. Tests on railways revealed that the temperatures of journal bearings in goods wagons, from normal to hot, are within a range that can be detected by an infra-red sensitive device located 3 to 5 ft. from the journal boxes.

Problems arose as to which part of the box should be viewed and where the pyrometer should be situated. The top of the journal box itself has the most metallic contact with the journal bearing and therefore the top side of the box would give a better indication than the lid, but this portion is inaccessible to view from any angle. It was decided that the wayside pyrometer should be mounted between the ends of two adjacent sleepers about 16 in. from the gauge line to the centre of the pyrometer lens. A second pyrometer is placed the other side of the track.

Operation of Pyrometer

The view centre line of the pyrometer is pointed in the direction of train movement and at an angle of 30 to 40 deg. above horizontal. In this way, as a journal box recedes beyond the detector, the pyrometer views first the bottom of the box and then up along the rear side to the top. The pyrometer has a meniscus lens which views an area on the box of 1 sq. in. The thermistor bolometer, or sensitive element in each pyrometer, receives infra-red rays from any and all heat sources within its range of vision all the time a goods train is passing. It is, therefore, necessary to confine the final recording of the indications to only the split second period when each box is being viewed and totally excluding all other heat sources such as hot brake shoes, hot wheel rims, and so on. The "hotbox" readings are recorded on a graph in the train controller's office and the circuit for the recorder is automatically controlled so that it indicates only while each box is in range of its respective detector. These controls are initiated by two wheel-actuated electromagnetic transducers each of which has the outward appearance of a metal case about 4 in. by 4 in. by 8 in. and these are bolted to the web of the rail. The top of the transducer is about 1¾ in. below rail level. The rim of the wheel passing through the magnetic field of the transducer generates a current which energises a relay in the circuits to the recorder. The second transducer indirectly releases the relay and disconnects the recorder. The arrangement is very sensitive and operates for any goods train speeds up to 60 m.p.h. The apparatus is protected in every possible way from dust, dirt, and moisture and a movable metal disc protects the lens. This disc is operated by a solenoid which removes it from the lens on train approach and recovers it when it has passed.

At locations where bridges are likely to be submerged by flood conditions flood detectors are installed consisting of cork floats which rise with the level of the water. By using a long rod from the float up to a circuit controller, warnings can be given to approaching traffic. These detectors are not only installed at bridges and alongside embankments but also at places upstream to detect oncoming rushes of water caused by heavy rainfall in surrounding hills.

The detection of rockfalls on to tracks is carried out by detector fences. These fences consist of a loose wire passed through staples attached to posts. The wire is spring controlled, the other end being attached to the end of a circuit controller. A fallen rock rests against a wire, or pulls against it in its downward journey thereby operating the circuit controller and interrupting the warning circuit. A modification of these devices detects the descent of soft mud and snowfalls.

The safety of trains can be endangered by fire in a number of ways such as sleeper or deck fires on bridges, tunnel linings and snow sheds. The detector in these cases consists of insulated No. 10 copper wire supported on porcelain insulators with a 2 in. soldered lap joint between each set of insulators. The solder melts at a comparatively low temperature. If a fire melts the solder, the weight of the wire opens the joint thus operating a circuit for a detector relay.

Warning Devices for Train Crew

Having detected a dangerous condition on the track or on passing vehicles, the next step is to give this information to engine drivers or motormen. This can usually be done by including the warning relay in the control circuit of the nearest suitable signal. Where ordinary signals are not available, some railways are using a flashing lunar aspect which indicates "stop train for inspection." The hot axlebox or dragging equipment may be on any part of the train and therefore these signals are positioned at a distance of one longest train length plus 1,000 ft. sighting distance from the detector. The use of such a single signal, with no approach aspect, is based on the fact that a flashing lunar aspect does not mean that a train is to stop at a signal but as soon after as is consistent with safety. In the case of detectors used for floods, fires, and falling rocks, the signals are located so as to stop trains before arriving at the point of danger.

On some railways these signals are fitted with a special marker which explains that the control of each signal so marked includes not only the usual block controls but also special detector devices. When train crews are stopped at such a signal and do not know what the devices included in the signal control are for, they can obtain this information from the timetable. They can then search for the obstruction.

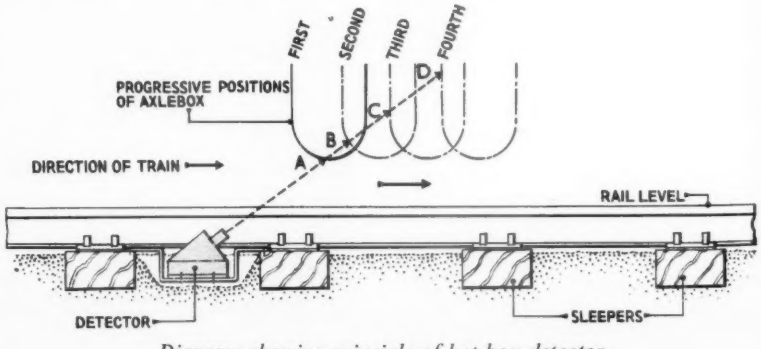


Diagram showing principle of hot-box detector

Testing Disc Brakes on Railbus

Monitor control of disc brake automatically prevents wheel skid under full power braking

AT the request of the manufacturers, British Railways, Scottish Region, recently carried out brake performance tests of the Dunlop Monitor Disc Brakes fitted on the Bristol railbus. This vehicle, built by Bristol Commercial Vehicles Limited in conjunction with Eastern Coach Works Limited, and weighing 13 tons 14 cwt., was described in our August 22, 1958, issue. The railbus used for the tests had completed 26,000 miles in passenger service, working between Elgin and Aviemore at an average weekly mileage of 1,800. This service involved about 900 brake applications per week, equivalent to 13,000 brake applications to date.

Run No.	Speed m.p.h.	Seconds stopping time	Measured distance	Gradient	Calculated average deceleration corrected	Calculated distance level track	Air pressure, lb. per sq. in.	Remarks
3	52	19.0	792 ft.	1–600 falling	3.70 ft./sec.²	700 ft.	58	Max. power braking
6	30	43.5	972 ft.	1–170 falling	1.47 ft./sec.²	662 ft.	58	Monitor shoes only
8	30	10.5	246 ft.	1–130 falling	4.18 ft./sec.²	230 ft.	58	Max. power braking disc and monitor
9	30	17.5	363 ft.	1–130 rising	2.41 ft./sec.²	400 ft.	Nil	No power braking max. effort on handbrake

The accompanying table gives a representative selection of the test figures obtained on runs interspersed between the normal passenger services. Runs 3 and 8, at speeds of 52 m.p.h. and 30 m.p.h., respectively, were typical full power braking stops and gave an average retardation of 4 ft./sec./sec. (2.72 m.p.h./sec.). This is a retardation of 0.125 g which was the designed performance of the brake. Test runs to simulate fault conditions are recorded in runs 6 and 9. Run 6, made with the hydraulic disc brake inoperative, shows the brake performance of the monitor shoe, the average braking force being one-fifth of the total braking. In run 9, simulating loss of air pressure, the handbrake retardation figures are shown. At an early stage in the operation of the railbus it was found necessary to fit splash guards to the air cylinders and filters on the air vents.

Brake Servicing

From experience to date it is estimated that the servicing time required on the disc brakes will show a substantial saving on the 5–6 man-hr. a month normally needed for servicing of the conventional brake equipment on diesel railcars.

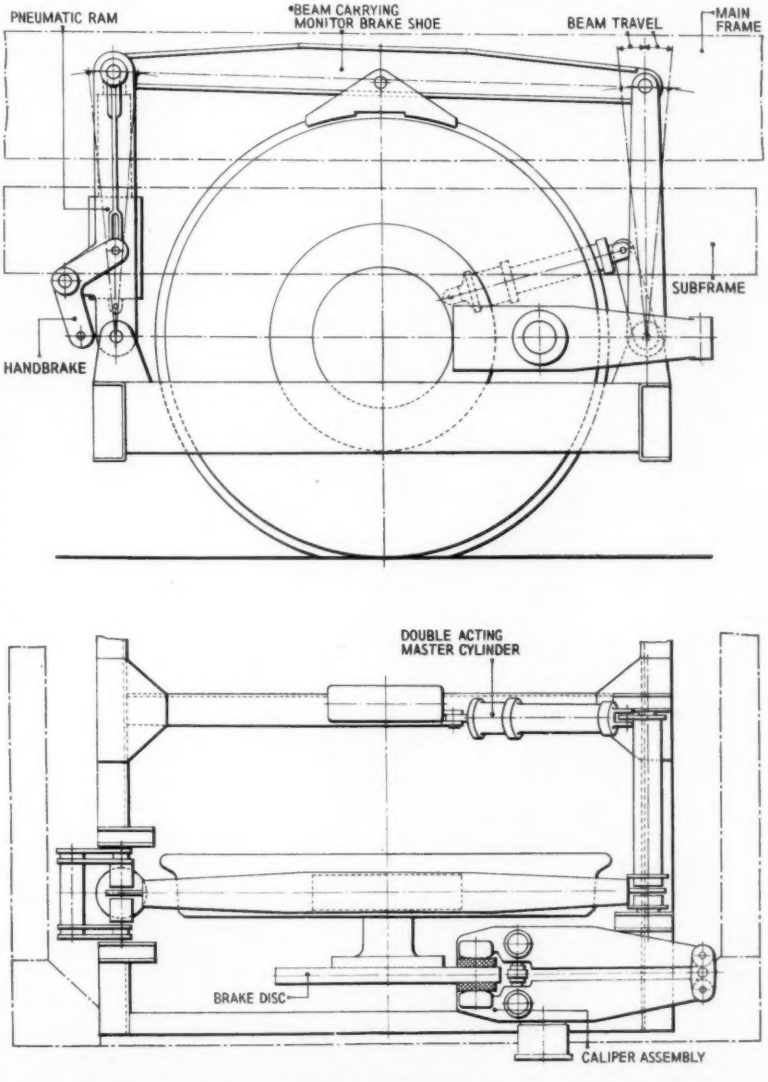
Routine lubrication has been eliminated by the use of oil-less type bearing bushes. It is stated that the disc brake pads on each wheel can be renewed in 8 min. The amount of wear recorded on the disc pads of the test vehicle indicates that these would have a life of 35,000–40,000 miles before replacement, and the monitor shoes a life of 30,000 miles. The cast-iron monitor shoes operate over the full width of tread which assists in maintaining the tread profile. It is also claimed that the light loading and lower temperature on the monitor shoe should relieve tyre wear.

An independent tank is provided for each brake and no topping-up of the hydraulic fluid has been required during the first eight months' operation of the vehicle.

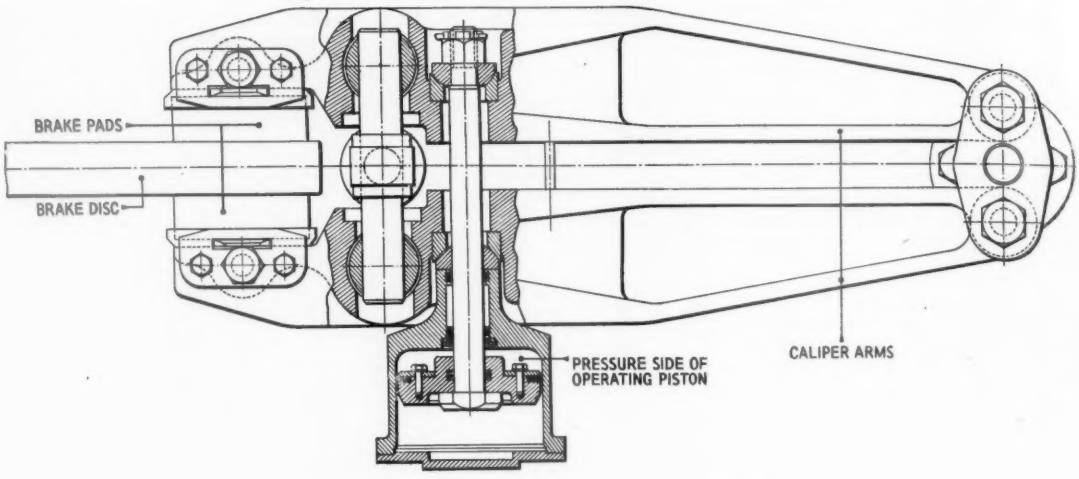
Development of Railway Brakes

Since the introduction of the Dunlop disc brake on aircraft in 1945 the company has acquired considerable experience in the technique required for the use of this type of braking on road vehicle, marine, and industrial applications.

An investigation of the brake characteristics required for railway service indicated two essential requirements: (*a*)



Elevation and plan of wheel and disc brake, showing assembly of monitor control gear



Detail of caliper and caliper cylinder shown in plan

means must be provided to keep the wheel tread clean to ensure a good contact for the A.T.C. equipment; and (*b*) some form of automatic control was required to prevent intermittent locking of the wheels under poor rail/wheel adhesion conditions. Service experience and the test results show that these requirements are met in the design of the Dunlop monitor disc brake.

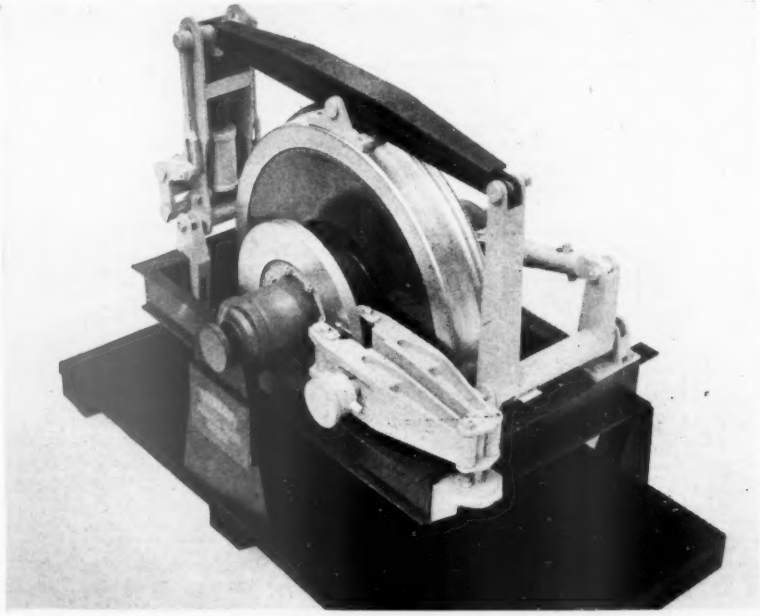
The monitor shoe which brakes against the tyre is pivot-mounted on a beam, which is anchored by a swing lever at one end and a pneumatic ram at the other. When the ram pulls the shoe into contact with the tyre the frictional drag swings the anchor lever about 2 in. in the direction of the wheel rotation. As the frictional drag is less under poor adhesion conditions the braking is automatically reduced by monitor-shoe sensing and wheel sliding controlled. On the pivot shaft of the anchor lever is a lever connected to the piston of a double-acting hydraulic cylinder. The oil pressure generated by the movement of the piston is used to pressurise the operating cylinder of the disc brake. The brake disc, 18 in. dia. x 1¼ in. thick, is bolted to the wheel hub. Light alloy is used for the caliper brake arms, and the brake pads are a specially developed friction material bonded to a steel plate. For ease of replacement the plate is located by a tongue and anchored by a single bolt.

Automatic Adjustment

A single hydraulic cylinder is used to pull the caliper pads into contact with the disc, and a simple automatic adjuster maintains a constant maximum running clearance of 0.010 in. on each pad. Under full power braking the operating pressure is 1,000 lb. per sq. in. maximum.

The handbrake linkage operates on the monitor brake shoe beam in a similar manner to the pneumatic ram.

It is claimed that the monitor disc brake is smooth in operation and that there is no fade. It is stated that the cost should be competitive with conventional type braking.



Model of Dunlop Monitor disc brake, showing principal components

Modern Railway Construction in Mexico

(*Concluded from page* 240)

required more than regular maintenance upkeep.

Labour is a constant problem for the contractor. In this mountainous area there is no local population from which it can be drawn and it all has to be imported. Consequently separation from families and social amenities makes the men stay on the job for an average time of only about three months. This continuous turnover creates many hazards and sometimes accidents due to inexperience of work in such rugged terrain.

At the main base-camp Cagsa has a large hospital staffed by a doctor and five nurses and equipped with an ambulance; a second hospital also has a doctor and three nurses. Two other difficulties are the feeding of the 2,000 men on the job and the transport of diesel oil for the machines. Food has to be delivered at each camp daily and the oil brought some 200 miles from the Pacific port of Guaymas. Wages are flown out from a Chichuahua bank every 10 days and are received at the airstrip by two Cagsa employees and six armed guards, who carry it on by car.

The estimated cost of the whole new construction averages $150,000 or about £53,500 a mile, a sum very much less than would be possible in the United States. The Federal Government places the value of the whole trunk line—including the original construction, its rehabilitation and the new link—when completed at $500,000,000, £178,500,000 approximately.

RAILWAY NEWS SECTION

PERSONAL

Mr. K. N. Sidebotham, Assistant District Passenger Manager, Manchester, London Midland Region, British Railways, has been appointed District Passenger Superintendent, Newcastle, North Eastern Region.

Mr. R. G. Grout, M.Inst.T., Chairman & Managing Director, General Steam Navigation Co. Ltd., who, as recorded in our March 27 issue, has been elected President of the Institute of Transport, took office on October 1. Mr. Grout was a Member of Council of the Institute 1948-51, 1953-55 and 1957-58, and was a Vice-President 1955-57. He has served on the Examinations, Journal & Awards, Finance, and Shipping Advisory Committees of the Council, and was Chairman of the last-named from 1954-58. He joined the General Steam Navigation Co. Ltd., in 1919. In 1928 he was appointed Manager of the company's branch at Havre and, ten years later, to a similar position at Antwerp. He was appointed Secretary of the company in 1941, and in 1943 was seconded to the Sea Transport Division, Ministry of War Transport, where he assisted in the detailed planning of D-Day. In July 1944 Mr. Grout went to Normandy with the British Liberation Army as Civilian Representative of the Director of Sea Transport. He returned to England in January, 1945, as Assistant Director, Coasting & Short Sea Division, Ministry of War Transport, where he stayed for nine months. He returned to the company, and in 1947 was elected to the board. In 1952 he went to the Suez Canal Zone, as Ministry of Transport Representative, Middle East. Two years later he was appointed Vice-Chairman & Managing Director of the General Steam Navigation Co. Ltd., and in September, 1958, became Chairman. Mr. Grout is a Fellow of the Institute of Chartered Shipbrokers; Member of Council, Chamber of Shipping; of the Committee of the London General Shipowners Society; of the London Steamship Owners Mutual Insurance Association; of the Management Committee of the t.s. *Worcester* of the Commission; of the Seafarers Education Service, and a Member of the board of management of the Royal Alfred Merchant Seamen's Society. He is Hon. Treasurer of the British Ship Adoption Society, and President-Elect for 1959-60 of the Institute of Shipping & Forwarding Agents. Mr. Grout is a Freeman & Liveryman of the Worshipful Company of Shipwrights and an Honorary Freeman of the Company of Watermen & Lightermen.

R. G. Grout
Appointed President of the Institute of Transport

Mr. W. L. King
Chief Electrical Engineer, South African Railways, 1957-59

Dr. L. G. Norman, Chief Medical Officer, London Transport Executive, is to visit Australia and New Zealand in connection with medical aspects of road safety. The visit is sponsored by the Post-Graduate Medical Committee of the University of Sydney. Dr. Norman will speak at a road safety congress in Sydney. He will be in Australia from October 19 to December 5, and in New Zealand from December 6 to 14.

Mr. James S. Frost, General Industrial Agent, Illinois Central Railroad, has been appointed Director of Industrial Development. He joined the Traffic Department in 1942; became Industrial Agent, Chicago, in 1954, and General Industrial Agent in 1955.

Mr. W. L. King, M.I.E.E., Chief Electrical Engineer, South African Railways, who, as recorded in our September 11 issue, has retired, joined the system as an apprentice in Durban in 1916. Mr. King became Assistant Engineer, Electrical Department, Bloemfontein, in 1933. Two years later he was appointed District Electrical Engineer, Cape Town, and was promoted to be Electrical Engineer, Durban, in 1940. He became System Electrical Engineer, Durban, early in 1942 and five years later was appointed Assistant Chief Electrical Engineer (Maintenance), Johannesburg. After acting as Chief Electrical Engineer on severa occasions, Mr. King was promoted to that position in 1957.

Mr. F. Edwards, Assistant General Manager, Siemens & General Electric Railway Signal Co. Ltd., has retired after nearly 37 years of service with the company.

Mr. V. G. Burchill has been appointed Assistant Publicity Manager, General Electric Co. Ltd. Mr. Roy Herbert becomes Chief Press Officer.

Mr. A. Neal, Transport Manager, Manchester Corporation, has been elected President of the Municipal Passenger Transport Association. Mr. S. P. Hill, Chairman, Nottingham City Transport Committee, becomes Vice-President.

XUM

Mr. F. W. Stokes, Works Manager, Powell Duffryn Carbon Products Limited, has been appointed to the board.

Mr. George Williams has been appointed Project & Development Executive, Wakefield Castrol Group.

Sir Leslie Rowan has been appointed Director of Finance, Vickers Limited. He also becomes a Director of Vickers-Armstrongs Limited and Robert Boby Limited.

Mr. T. Marsland, M.I.Loco.E., Commissioner, Western Australian Government Railways, who, as recorded in our May 29 issue, retired at the end of July, was educated at Ardwick Higher Grade School, Manchester, gaining an exhibition at the Manchester College of Technology. He was apprenticed to Beyer, Peacock & Co. Ltd., Manchester, in 1909, and later became a junior draughtsman. During the 1914-18 war he served with the Royal Field Artillery. On demobilisation, he rejoined Beyer, Peacock & Co. Ltd. He later was appointed Electrical Locomotive Designer with the Metropolitan-Vickers Electrical Co. Ltd., but subsequently returned to Beyer, Peacock & Co. Ltd. In 1928 he took up an appointment with the Mechanical Branch Western Australian Government Railways, as a locomotive draughtsman. Mr. Marsland was promoted to be Assistant Workshops Manager at the Midland Junction Workshops in 1937, and later Assistant Chief Mechanical Engineer & Chief Draughtsman. He became Chief Mechanical Engineer, in 1950, and was appointed Commissioner of the Western Australian Government Railways, last year. He is a Member of the Institute of Engineers (Australia).

Mr. K. Neve has joined the board of Turner & Newall Limited.

Mr. R. A. Hicks has been appointed Senior Design Engineer, Servomechanism Design Department, W. H. Allen Sons & Co. Ltd.

Mr. D. H. Outwin has been appointed Sales Manager, Materials Handling Equipment (Great Britain) Limited.

Mr. D. G. Heywood has been appointed Representative (Yorkshire, Lancashire, Cheshire & North Lincolnshire), Hilger & Watts Limited.

Mr. A. R. Black, Assistant Secretary, West Yorkshire Road Car Co. Ltd., has been appointed Secretary.

Lt.-Colonel D. W. R. Walker has resigned from the board of Flexible Drives (Gilmans), Limited. Mr. H. Middleton-Hands who is also Chairman, is now sole Managing Director.

Mr. Robert G. Allen, President of the Bucyrus-Eire Company of Wisconsin, has been appointed a Director of Ruston-Bucyrus Limited, and has been elected Chairman of the board, to fill the vacancy caused by the resignation, for health reasons, of Mr. William L. Litle.

Mr. P. H. R. Lane, Deputy Chief Metallurgist, British Welding Research Association, has been appointed Head of the newly-created Members Service Department. Mr. R. G. Burt, Chief Development Officer, remains with the Association as Development Consultant. Mr. L. Parkes has taken over as Editor for reports and publications.

Mr. G. J. Lyons has been appointed Secretary of the Institution of Plant Engineers. He succeeds Mr. R. F. Farmer, who has resigned to take up an appointment with the Institution of Civil Engineers.

Mr. C. G. C. Wayne, M.Inst.T., General Manager, Tasmanian Government Railways, who, as recorded in our May 29 issue, has been appointed Commissioner, Western Australia Government Railways, was educated at the London School of Economics & Political Science; King's College, and the School of Oriental Languages, University of London. After graduating in transport subjects, Mr. Wayne took a course on the London & North Eastern Railway and on the Chicago Milwaukee & St. Paul Railroad. He served with the Shanghai Nanking Railway, Chinese Government Railways, and later transferred to the Buenos Ayres Great Southern and the Buenos Ayres Western Railways. He joined the Tasmanian Government Railways, in 1949, as Traffic Advisory Officer, was appointed Deputy General Manager, in 1951, and General Manager & Associate Commissioner of Transport in 1952. On three occasions, during his term as General Manager, Mr. Wayne has been highly commended by the Commonwealth Grants Commission for his positive and successful approach in solving problems associated with the financial position and general management of the Tasmanian Government Railways. He has carried out special investigations in several countries, including Ceylon, the United Kingdom and Northern Ireland, France, Italy, Western Germany, Belgium, the Netherlands, and Canada. He speaks fluent Spanish, and holds the Diploma of London University for speaking and writing Chinese.

Mr. T. Marsland
Commissioner, Western Australian Government Railways, 1958-59

Mr. C. G. C. Wayne
Appointed Commissioner, Western Australia Government Railways

Mr. W. F. Beatty

Appointed New Works Officer, London Midland Region

Mr. W. F. Beatty, M.B.E., B.Sc., M.I.C.E., District Engineer, Crewe, London Midland Region, British Railways, who, as recorded in our August 28 issue, has been appointed New Works Officer, London, was educated at Royal Academical Institution, Belfast, and at Queens University, Belfast. Mr. Beatty joined the former London Midland & Scottish Railway, Northern Counties Committee, in 1930, as Engineering Assistant and transferred to the Civil Engineer's Department, L.M.S.R., in 1938. From 1938-44 he was in charge of the concrete depot, Newton Heath, and during this period acted as Resident Engineer in charge of the Direct Labour Organisation in the north of England. In 1944 he was appointed Assistant District Engineer, Blackburn and, in 1945 moved to Watford in a similar capacity. He became Works Maintenance Assistant at Euston (1950), New Works Assistant (1951); Acting District Engineer, Crewe (1953); and District Engineer, Crewe (1954). Mr. Beatty was awarded an M.B.E. in 1950. He is a Fellow of the Permanent Way Institution.

Mr. K. G. C. Nicholls has been appointed Manager of the Walsall branch of Atlas Copco (G.B.) Limited.

Mr. Maurice Tattersfield has been elected to the board of the George Cohen 600 Group Limited. He was appointed Financial Controller of the group last year.

Mr. Thomas Twomey, General Manager, Eagre Construction Co., Ltd., has been made a Director of that company, together with Mr. John P. P. Spafford and Mr. David M. H. Spafford.

Dr. F. Llewellyn Smith and Mr. I. W. Macdonald have been appointed Part-Time Members of the National Research Development Corporation. They will succeed Sir John Duncanson and Sir Rowland Smith whose appointments have expired.

The following have been elected Directors of B.H.D. Engineers Limited: Mr. P. Rushworth (Director & secretary, W. C. Holmes & Co. Ltd.), Mr. A. J. M. Henshaw (Director & General Sales Manager W. C. Holmes & Co. Ltd.), and Mr. P. Croset (Managing Director, Holset Engineering Co. Ltd.).

The Institution of Locomotive Engineers

The following names have been entered on, or transferred in, the register of members of the Institution of Locomotive Engineers:—

Members

Mr. J. L. R. Barnes, Special Director & Chief Engineer, Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Mr. D. L. Campbell, Manager, Queen's Park Works, North British Locomotive Co. Ltd.

Mr. J. F. Muncherjee, Chief Mechanical Engineer, Western Railway, India.

Mr. H. W. Scott, Technical Manager North British Locomotive Co. Ltd.

Associate Members

Mr. V. A. Barton, Technical Representative, George Stephenson & Co. Ltd.

Mr. W. E. Burke, Test Engineer, Motive Power Section, Western Australian Government Railways.

Mr. S. Fisher, Leading Inspector, Dynamometer Car, Darlington, North Eastern Region, British Railways.

Mr. K. Foster, Inspecting Engineer, George Guthrie & Co. Ltd.

Mr. F. H. Gates, Senior Sales Engineer, Metropolitan-Vickers Electrical Co. Ltd.

Mr. D. A. Hawkins, Traction Projects Engineer, Metropolitan-Vickers Electrical Co. Ltd.

Mr. J. Holden, Mechanical Inspector, C.M. & E. E.'s Dept., Doncaster, North Eastern Region, British Railways.

Mr. A. T. Ing, Locomotive Shedmaster, Waterloo, Southern Region, British Railways.

Mr. P. W. Jones, Technical Assistant, Diesel Section, C. M. & E. E's. Dept., Glasgow, Scottish Region, British Railways.

Mr. R. A. Kraus, Works Manager, Coach Works, Jessop & Co. Ltd., India.

Mr. C. Lunnon, Traction Engineer, National Coal Board.

Mr. K. A. Moorthy, Locomotive Works Assistant, C.M.E's. Dept., Malayan Railway.

Mr. B. L. Moultrie, Deputy Manager, Railway Traction Dept., Rolls-Royce Limited.

Mr. R. W. Nesbitt, Assistant Production Engineer, Acton Railway, Overhaul Works, London Transport Executive.

Mr. A. D. Pimm, Inspecting Engineer to Rhodesia, New South Wales, Queensland & Western Australian Government Railways.

Mr. L. D. Porta, General Manager & Chief Engineer, Rio Turbio Railway & Port of Rio Gallegos.

Mr. A. G. Powney, Mechanical Engineer. Jamaica Government Railway.

Mr. W. V. Ross, Locomotive Shedmaster, Blaydon, Motive Power Department, North Eastern Region, British Railways.

Mr. A. L. Sanders, Technical Representative, Metropolitan-Vickers Electrical Co. Ltd., on South African Railways.

Mr. E. M. S. Smith, Assistant Mechanical Engineer, Rhodesia Railways.

Mr. H. C. Steel, Motive Power Shedmaster, C.M.E's. Department, East African Railways & Harbours.

Mr. P. F. Stock, Engineer, Traction Projects & Engineering Department, Metropolitan-Vickers Electrical Co. Ltd.

Mr. K. A. Tikku, Fuel Officer, North Eastern Railway, India.

Mr. E. F. Trotter, Technical Assistant, C.M. & E.E. Department, Eastern & North Eastern Regions, British Railways.

Mr. D. Vause, Assistant Electric Traction Engineer, C.M. & E.E's. Department, Liverpool, London Midland Region, British Railways.

Mr. E. N. White, Service Manager, Hoffmann Manufacturing Co. Ltd.

Mr. E. C. Whiteley, Senior Sales Engineer, Traction, Metropolitan-Vickers Electric Co. Ltd.

The late Mr. R. H. Whittington

Assistant Chief Operating Superintendent, E. A. R. & H. 1955-59

Mr. R. M. Williams, Mechanical Engineer, Technical Services Branch, British Petroleum Co. Ltd.

Mr. W. R. Williams, Draughtsman, Carriage & Wagon Works, Eastleigh, Southern Region, British Railways.

We regret to record the death on September 19, at the age of 48, of Mr. R. H. Whittington, Assistant Chief Operating Superintendent, East African Railways & Harbours. Mr. Whittington joined the Great Western Railway, in 1926, in the office of the Superintendent of the Line. In 1938, after serving in other departments, he was appointed Junior Assistant to the Divisional Superintendent, Paddington. During the 1939-45 war he served as Senior Naval Transport Officer, with the rank of Lt.-Commander. He returned to the G.W.R. in 1946 as Assistant Divisional Superintendent, Bristol. Mr. Whittington joined the East African Railways & Harbours, in 1949, as District Traffic Superintendent, and in 1955, was made Assistant Chief Operating Superintendent. Mr. Whittington's grandfather, Mr. Frank Potter, was General Manager of the Great Western Railway from 1912 to 1919; his uncle, Mr. F. R. Potter, was Superintendent of the Line, of the same railway from 1936 to 1940.

Mr. F. S. Bryant has been appointed Midland Area Manager of Silentbloc Limited.

Mr. H. I. Wonfor has been appointed to the board of Associated British Engineering. Mr. E. M. Benjamin has resigned from the board.

Mr. T. G. Munro has been appointed Sales Manager of Southern Forge Limited. He was previously in charge of publicity and market research.

Mr. S. R. Howes retired from the Board of the United Steel Companies on September 30. He will remain Managing Director of Templeborough Rolling Mills Limited.

Mr. W. E. A. Redfearn, Director of the English Steel Corporation Limited and Deputy Managing Director of the English Steel Forge & Engineering Corporation, has been appointed Chairman of the National Forge Masters Association in succession to the late Sir Frederick Pickworth.

XUM

NEW EQUIPMENT AND PROCESSES

Tamping Machine

THE Jackson Jack-Spot tamper is a self-contained and self-propelled machine that lifts rail and tamps ballast under sleepers to hold the lifted rail. It is one-man operated, primarily using electro-hydraulic controls.

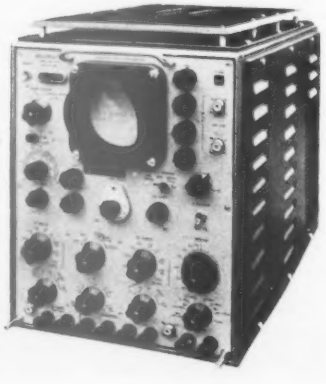
Four standard motor-driven tamping units place the ballast, two per workhead held in cross-tamping position (diagonally across rail and sleeper). They are supported by two workheads which move independently or together to raise and lower the tamping units into the ballast. They are operated by an electric switch actuating hydraulic control valves which control double-acting rams to raise or apply down-pressure to tamping units.

The rails are raised independently or together by the operator. Rams controlled by electric switch buttons operate hooks that clamp the rail in sequence with rams that push down on the ballast outside the sleepers to raise the machine and clamped rail.

Travel is accomplished by hydraulic drive through standard bogie transmission to the front wheels. Forward and reverse motion is controlled by electro-hydro two-way valve. The power unit contains a petrol engine driving a generator and hydraulic pump.

The machine is raised and turned on a hydraulic ram on the central-balance point of the chassis. It is used for power set-off on cross rails or complete reversal of direction.

Further details can be obtained from the manufacturer, the Electric Tamper Export Company, Engineering Building, 205, W. Wacker Dr., Chicago 6, Illinois, U.S.A.



Double-Beam Oscilloscope

THE CD711S.2 is a dual-channel instrument incorporating only those components which meet M.o.S. Specification DEF.5000, thus ensuring a high performance and reliability for all laboratory and field service applications.

Main features include identical circuits for "Y1" and "Y2" channels; negligible trace interaction; crystal-controlled time markers; and 4-cm. pictures at 7 mc.

The beam-switching, 150 kc. chopping, or alternate sweeps, allows the full brightness of the 4EP7 cathode-ray tube to be used with complete freedom from trace interaction.

The "Y" deflection channels have identical circuits, additional a.c. pre-amplifiers providing a maximum sensitivity of 3 mV per cm. Three diameters of "Y" shift are available on each channel.

The time base has a basic coverage of from 0.3 micro-sec per cm. to 3 sec. per cm. with up to x10 symmetrical expansion giving a maximum velocity of approximately 0.03 micro-sec. per cm. (33 cm. per micro-sec maximum sweep speed).

Measurement of velocity is by substitution of crystal-controlled time markers on the "Y2" channel. The time markers can be used to pre-calibrate the screen graticule, which is edge-illuminated and divided into a 1-cm. grid. Excellent time-base synchronisation is obtainable, operating free-running or triggered, from internal or external sources.

Trigger delay is continuously variable from 10 micro-sec to 10 mSec., in three switched ranges, fine control being effected by a 10-turn helical potentiometer.

Additional features include highly stable HT and RF EHT supplies; DC "Z" (brightness) modulated and trigger "bright-up;" automatic suppression of both switching and flyback waveforms and an output socket for a powered probe.

Standard oscilloscope cameras can be fitted to the CD.711S.2 for trace photography and an oscilloscope trolley can be supplied for mobility. Other tubes can be fitted.

Measurements are 18½ in. high x 13½ in. wide x 26¼ in. deep. Weight is 118 lb.

Further details can be obtained from the Solartron Electronic Group Limited, Thames Ditton, Surrey.

Liquid Plastic Aluminium

DEVCON F.2, a plastic aluminium, has been designed for applications requiring an aluminium material of liquid consistency.

Tough enough when hardened to withstand sledgehammer blows, it has many uses including the making of foundry patterns, core boxes, plastic sign moulds, and jigs, the repairing of fabricated aluminium parts, and the filling of large holes in ferrous and non-ferrous castings.

The material contains 80 per cent aluminium and 20 per cent plastic. Applied in liquid form by brush or poured on surfaces, it bonds to iron, steel, bronze, brass, glass, concrete, and other materials. Hardening takes place in 1½ to 2 hr. at 70-75 deg. F., to form a rigid, metallic mass. Because volatile solvents or thinners are not used, it will not shrink or pull away during hardening. No heat or pressure is needed, and the material is unaffected by normal anodising solutions.

It can be drilled, ground, sanded, or threaded, and machined to a feather edge without cracking or flaking. A highly-polished finish can be obtained.

Further details can be obtained from the distributors, E. P. Barrus (Concessionaires) Limited, Acton, W.3.

Orbital Sander

THE "Sandswift" orbital sander weighs only 7 lb. 3 oz. and incorporates a continuously-rated motor. Work can be taken up close to skirting boards and frames without damage as the orbit area of pad is $\frac{1}{16}$ in. less than body frame. The unit can be placed safely on its side without waiting for the pad to come to a standstill after switching off.

The sander is supplied complete with 10 ft. of 3-core T.R.S. cable, hexagon key for pad removal, sponge rubber pad, and fine, medium and coarse aluminous-oxide open-coat sanding sheets.

Further details can be obtained from Wolf Electric Tools Limited, Pioneer Works, Hanger Lane, London, W.5.

Silicones in Welding

A PATENT recently published describes the use of silicone pressure-sensitive materials in welding. A weld-backing assembly, consisting of glasscloth impregnated and coated with a silicone pressure-sensitive adhesive, to which is attached a flexible steel tape, firmly adheres to the work places. The backing is easily stripped off.

Other assemblies are described, including

one comprising alternate layers of heavy aluminium foil and pressure-sensitive silicone adhesive. It is thought that the invention may prove particularly valuable in the welding of irregular shapes and curves.

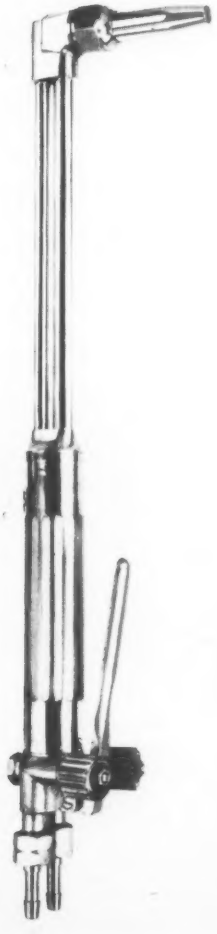
Further information can be obtained from the Head Sales Office of Midland Silicones Limited, 68, Knightsbridge, London, S.W.1.

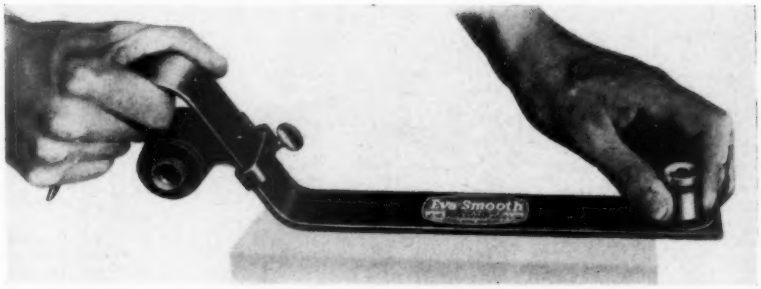
Cutting Equipment

THE "Lightning Cutter" is the latest addition to the range of welding and cutting equipment manufactured by the D. S. Baddeley Engineering Co. Ltd. This cutter is capable of cutting thicknesses from ⅛ in. to 14 in., and a full range of one-piece nozzles is available, including multi-hole nozzles for general cutting, and step, rivet, and gouging nozzles.

The cutter is suitable for high- medium- and low-pressure acetylene gases and, by using the correct type of nozzles, other fuel gases can be used. When mixed in the new cutter, the gases are so balanced that backfiring is eliminated. The "Lightning Cutter" was expressly designed to allow great economies to be made in the consumption of oxygen and whatever fuel gas is used.

Further details can be obtained from the manufacturers, the D. S. Baddeley Engineering Co. Ltd., 43-45, York Street, Glasgow, C.2.





Supports for Tunnels

A NEW approach to the problem of providing permanent arch supports in tunnels where major distortion is unlikely has been made after a careful study of the theoretical problems in conjunction with the practical experiences of mining engineers and mining economists.

One type of support is a development of the already wide application of the manufacturer's cellular reinforcement. The feature of the construction is its honeycomb pattern in which the strips are linked with patented independent pin joints. The use of independent pins makes for resistance to corrosion for unstressed pins are less prone to corrosion than integral lugs. For rigid structures, honeycomb strips may be riveted or welded.

The second type of support is made up of several 2½-in. deep, 5/16 in. thick steel flat girder bars, spaced at any interval across the mesh. The standard pattern has girder bars at intervals of 12 in. Above and below these bars are laid mats of 3-in.-sq. electrically welded mesh of 6 s.w.g. mild-steel wire. Mesh and bars are secured and locked with 16 s.w.g. clips. The bars can thus be clamped to give a rigid frame. The four girder bars have a cross-sectional area equal to that of a 3-in. by 3-in. R.S.J. The wire mesh extends a further 4½ in. at each side of the end girders, giving a total width for the standard fabrication of 3 ft. 9 in.

Both types provide continuous protection against roof and side wall falls and, unlike spaced girders, require no additional space lagging. Considerable resistance to airflow for ventilation is set up by the hazard of multiple conventional steel arches. These arches greatly diminish this hazard and, with the addition of a thin skin of concrete, provide a practically frictionless tunnel wall.

Further details can be obtained from Causeway Reinforcement Limited, Five Ash Works, Dover Road East, Northfleet, Kent, or from the London Office at 11a, Albemarle Street, London, W.1.

Hand Tachometer

THE ATH.24 hand tachometer is designed for use with machinery of speed ranges of up to 4,000 r.p.m., when it is preferable to use a tachometer especially designed to suit this range, where inaccuracies in reading would be proportionately more serious than those obtained with speeds approaching, say, 50,000 r.p.m.

The model has a range of 0-400, 0-2,000 and 0-4,000 r.p.m. The dial is calibrated with a dual scale, the outer 0-2,000 r.p.m. and the inner 0-400 r.p.m.

Accurate checks can be made on rotational linear, and surface speeds. Indication is instantaneous; the instrument is not damaged by sudden acceleration, and a pointer lock device holds the reading. R.P.M. or surface speeds are indicated to an accuracy of ± ½ per cent. The instrument is completely unaffected by position, humidity, or wide ranges of temperature.

Further details can be obtained from Smiths Industrial Instrument Division, Chronos Works, North Circular Road, London, N.W.2.

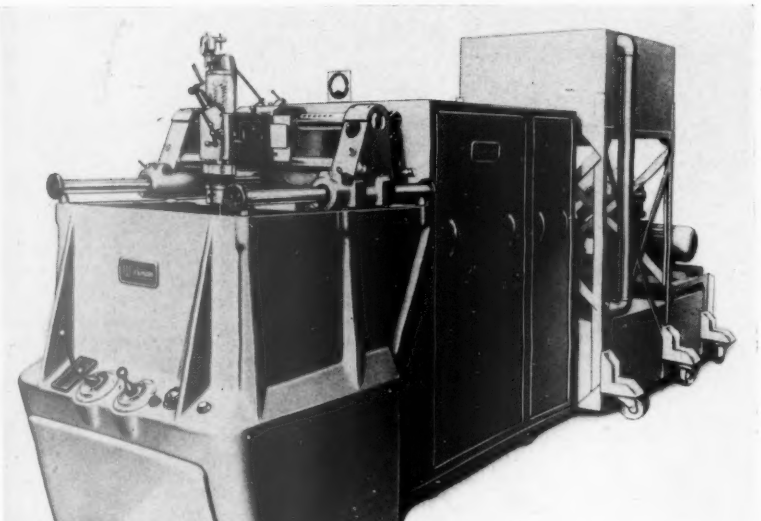
Abrasive Tape File

THE Eva-Smooth abrasive tape file is supplied with medium-grade emery tape which is simply changed or renewed by the operator. A range of graded tape-rolls give the file great versatility; fitted with the correct grade of tape for the job, it can be used on all types of metal or wood. The tape-rolls are cut to fit the width of the file to ensure that wastage does not occur at the edges.

Further particulars can be obtained from the manufacturer, J. W. Pickavant & Co. Ltd., Apkoway Works, Birmingham.

Valve Lifter

A NEW roller cam-action valve lifter incorporates the following "built-in" features: powerful and smooth roller cam action; self locking; accurate adjustment for maximum and positive compression of valve spring; strong but slender jaws for accessibility, and rigid construction. The lifter has a nickel plate finish and weighs 19 oz. It is set for use on overhead-valve



engines, but can be adjusted by the operator to deal with side-valve engines.

Further details can be obtained from the manufacturer, J. W. Pickavant & Co. Ltd., Apkoway Works, Birmingham 1.

Spark-Machine for Die-sinking

THE Erodomatic machine has been developed to extend the use of the principle of spark erosion as a production operation.

The W/OM is a semi-automatic machine particularly suitable for the sinking of forging dies up to 28 in. × 16 in. × 15 in. deep. Push-button controls permit auto-die-sinking after setting-up.

The equipment is designed as three units; machine tool, generator, and dielectric fluid circulator. Each unit can be positioned to suit the shop layout. Two sizes of generator can be fitted and a range selector switch allows a high, medium, or low rate of cutting.

The machine body is a light-alloy casting with the upper part extended to form a tank for the dielectric fluid in which the die-block is immersed. The cutting electrode is carried in a servo-head fitted with a built-in electric motor. Slides and gearing allow the electrode to move in any direction for cutting. To facilitate fitting and inspection, the finely-adjustable servo-head can be pivoted to a horizontal position.

To reduce setting-up time, spare worktables are supplied, allowing worktable and component to be lowered to fixed locations in the machine. No clamping down is required. Warning indicator lamps and safety switches are incorporated for the protection of machine and operator.

Further details can be obtained from the manufacturers, Wickman Limited, Banner Lane, Tile Hill, Coventry.

Universal Industrial Tractor

POWERED by a 37 b.h.p. diesel engine, a versatile industrial tractor designated the M:F. 702 is in production for the home and overseas markets. Weighing 3,800 lb. it is basically a three-in-one unit. It is fitted with a loader at the front and a digger at the rear. Provision is also made for speedy conversion into a mobile crane or fork-lift truck.

Wheelbase is 77 in., front track 52⅜ in., and rear track adjustable between 52 in. and 72 in. Normal tyre equipment is 6.00—16 front and 11—28 rear.

Hand and foot brakes and lighting meet road transport regulations. Power-assisted steering reduces steering wheel effort to 3½ lb. on the wheel rim and, should the power hydraulics fail, normal manual steering is available.

The hydraulic steering is in a self-contained unit powered by an engine-driven pump. For the main hydraulics, a pump operating at 1,800 lb. per sq. in. is direct-coupled to the front end of the crankshaft.

The rear-mounted digger is a compact, manoeuvrable machine with a high operating speed. The digger frame is anchored by links to the tractor side-frame members, and the complete unit can be easily detached by the removal of four pins.

Provision is made on the frame for attaching the boom pivot post in the centre or at each side. This permits flush trench-digging along an existing wall, fence, or foundation. Operator's seat and control levers are mounted over the pivot post, so that the seat pivots with the boom for maximum visibility.

Rotation is by hydraulic rotary actuator. Double-acting jacks operate the boom, digging arm, and bucket. When centrally mounted, the digger can operate through an arc of 185 deg. and can work at right-angles to the tractor centreline. Bucket reach is 13 ft. 8 in., a distance which allows digging to a depth of 12 ft. Bucket widths from 12 in. to 36 in. can be supplied and also a 24 in. face shovel. Digging loads are taken on two independently-controlled stabiliser feet. These also allow the machine to be levelled for work on uneven ground.

The general-purpose loader at the front end is stated to be capable of moving 60 cu. yd. hr. Double-acting rams ensure good bite and positive front-end control. The shovel is capable of lifting 2,000 lb. at 2,000 r.p.m. with breakaway at 3,000 lb. An overall lift height of 11 ft. 8 in. is possible with a bucket clearance height of 9 ft. 8 in. and a dump height of 8 ft. 6 in. Fitted below the bucket is a scarifier attachment for surface loosening.

Further details can be obtained from the manufacturer, Massey-Ferguson (G.B.) Limited, Fletchampsted Highway, Coventry.

Constant-Potential Rectifier

THE MRF 600L is a new constant-potential rectifier which is claimed to give superior performance to that of any constant-potential rectifier previously marketed.

This new power source provides a really flat volt/ampere characteristic over its entire working range; it also compensates instantaneously for fluctuations in mains supply voltage, so that welding output is always maintained at pre-set value. Remote control of welding conditions is possible and there is a high open-circuit voltage for arc initiation. These features are provided by a magnetic amplifier-controlled circuit of new design.

Arc voltage is continuously variable between 20 and 38V. and the welding current range is 200-600A.

Further details can be obtained from Quasi-Arc Limited, Bilston, Staffs.

Rolling Stock Exhibition at Colchester—St. Botolphs

British Railways, Eastern Region, held an exhibition of locomotives, rolling stock, and containers at St. Botolphs Goods Yard, Colchester, on September 26 and 27. Travel and other films were shown in a cinema coach.

Locomotives displayed were a "J69" class 0-6-0T, one of a series introduced by the former Great Eastern Railway in 1902, and used on the Liverpool Street to Enfield and Chingford suburban services; a Class "7" 4-6-2 built in 1951; and a Brush Type "2" A1A-A1A 1,365-h.p. diesel-electric locomotive with Mirrlees "JVS12T" four-stroke engine.

Coaching stock on view included a first class open saloon coach built by Cravens Limited and described in our July 9, 1957, issue; a first class sleeping car with 11 single-berth compartments; a second class sleeping car with 11 two-berth compartments; and a camping coach.

Among goods vehicles were a 12-ton capacity pallet van; a "palbrick" wagon with removable sides for refractory bricks and firebricks on pallets; a 20-ton bulk grain wagon with loading through roof and hopper bottom door; and a 24-ton covered hopper wagon. Also shown were a 20-ton "airslide" wagon for cement and other powders in bulk providing pressure discharge through an "air-slide." The latter consists of a porous rubber pad sandwiched between two perforated metal sheets. Air is fed through the slide by means of a compressor up to 20 lb. per sq. in. pressure to the bottom of the material in the wagon to be discharged. This fluidises the material in the immediate vicinity and builds up a predetermined pressure on the top surface. When a discharge valve near the fluidised area is opened the material flows in the direction of the outlet where movement is accelerated by the action of two air streams introduced into the discharge pipe in the form of ejectors. Besides discharge from rail to road vehicles discharge can be effected to silos at rail-connected premises about 50 ft above rail level.

Containers for general merchandise and special traffics were shown, and Collico collapsible metal cases

New Railhead Depot for Cement Traffic at Bristol

A warehouse for use by the Cement Marketing Co. Ltd. as a railhead depot has been built by British Railways, Western Region, at Avonside Yard, Bristol.

Constructed to a comparatively simple design, the structure is 117 ft. long, 46 ft. wide, and 16 ft. to eaves. It consists of a reinforced-concrete shell barrel-vaulted roof which incorporates continuous curved roof glazing at the crown of each vault and is supported on fairfaced reinforced concrete columns in-filled with panel walls of concrete blocks and rendered externally with the Cement Marketing Company Cullamix stippled finish.

For ease in moving and stacking hand trucks, the concrete floor of the building, built up to the level of two rail loading bays, is laid with a gradual fall towards the end of the building, where the loading of lorries will be carried out under a continuous canopy through three openings fitted with steel roller shutters.

Accommodation is available for some 400 tons of bagged products. When the depot is working fully it is expected that about 100,000 tons a year of rail-borne cement will be dealt with.

The warehouse was designed by Mr. H. E. B. Cavanagh, A.R.I.B.A., Architect, British Railways, Western Region, under the direction of Mr. M. G. R. Smith, M.I.C.E., Chief Civil Engineer. Erection was by Stone & Co. Ltd., Bristol.

An existing office adjoining the warehouse has been completely replanned by the Cement Marketing Co. Ltd. and adapted at its own cost. Messroom accommodation for the staff is provided by a pent-house built over part of the office building.

To deal with bulk cement, the Cement Marketing Company, also at its own cost, has installed a 200-ton silo (150-ton main holder, with a 50-ton subsidiary) of reinforced concrete. The height is 60 ft. above rail level.

Cement will be discharged into the silo from Presflo wagons on a siding. The compressor for discharge was supplied to British Railways by Thomson & Taylor Limited. It is diesel-engine driven, and can deliver cement to silo at about one ton a min.

Loading of the Cement Marketing Company's own pressurised vehicles will be by gravity feed from the silo, with automatic cut-out operated in conjunction with a weighbridge immediately underneath the silo.

The Cement Marketing Co. Ltd. has for many years maintained a railhead depot at the Western Region depot, Bristol, at Lawrence Hill. Continuous increase in its products has necessitated the larger and improved facilities now completed.

Major Alterations at Colchester Station

Pre-requisite to the electrification between Chelmsford and Colchester Eastern Region

As an integral part of the electrification of the line between Chelmsford and Colchester, due to be completed in 1962, the Eastern Region of British Railways is to carry out extensive alterations to the station buildings and running lines at Colchester.

In the reconstructed station, the principal buildings will be on the up platform. The shell of the existing buildings on this platform will be retained, but considerable internal alterations will be made. There will be a large booking hall and ticket office, refreshment room, enquiry office, bookstall, public waiting rooms and lavatories, a parcels depot, telegraph office, and office and amenity accommodation for the station staff.

Extensions to Existing Buildings

Single-storey extensions will be built at the east and west ends and on the platform face of the existing buildings. The extensions will be built in brick with timber windows and doors, and central heating will be installed. A small canopy will be built along the north elevation to connect with the main platform awnings. The present south-elevation will remain practically unaltered.

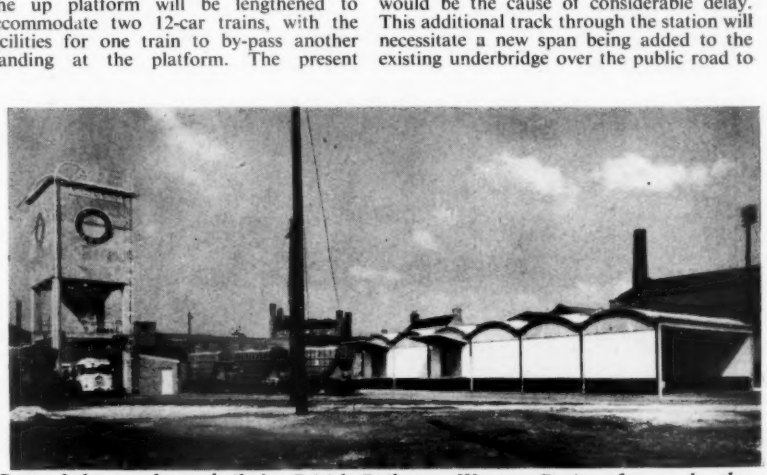
The refreshment room will have cafeteria service and a bar, and will be fitted with bar stools, fixed tables and seating. The face of the bar will be treated with a decorative panel in photo-laminate plastic.

Ticket issuing facilities will be concentrated in one mechanised ticket office equipped with standard steel office furniture. The up platform will be lengthened to accommodate two 12-car trains, with the facilities for one train to by-pass another standing at the platform. The present down platform will be converted to an island platform and extended to accommodate 12-car trains. All the buildings on this platform will be completely new and will include public waiting rooms and lavatories, a small refreshment room and various offices for railway staff. The construction and finishes generally will be similar to those on the up platform.

The bay platforms at each end of the up platform will be retained to accommodate starting and terminating services. Platforms will be joined by an existing subway which will be extended to the north side of the station where a separate entrance for ticket holders will be provided.

Adjoining the entrance on the north side will be accommodation for public and staff bicycles and motor cycles. Parking space for 300 motorcars will be available, the majority in a new car park to be constructed on the down side of the station. This will augment the existing parking space on the up side, which will remain.

The main features of the track work to be carried out are the re-alignment of the main lines through the station to provide for a maximum speed of 90 m.p.h., the provision of two additional tracks and platform faces and the construction of a single track dive-under for the down Clacton line. The extension of electrification from Chelmsford to Cholchester will make possible an augmented train service and the provision of this dive-under will avoid conflicting train movements across the up main line which would be the cause of considerable delay. This additional track through the station will necessitate a new span being added to the existing underbridge over the public road to



Part of the warehouse built by British Railways, Western Region, for use by the Cement Marketing Co. Ltd., at Avonside Yard, Bristol

XUM

the east of the station. A new skew span bridge under the Ipswich main lines will also be constructed.

Other works in the vicinity of Colchester station will include a depot for the maintenance of the electrical overhead line equipment; stabling and cleaning sidings for electric multiple-unit and locomotive-hauled rolling stock, with a carriage washing plant; and the demolition of the existing steam motive power depot and the provision of facilities for the servicing of diesel locomotives and diesel multiple-unit trains.

Associated with the electrification of the lines, continuous track circuiting and colour-light signalling will be installed between Chelmsford and Colchester. New signal-boxes will be constructed at Witham and Colchester and route relay interlocking installations provided at both places.

The existing signalbox at Marks Tey will remain but all signal and points controls will be modernised. A new relay room will be built to accommodate the new equipment. Automatic signal sections are to be provided between Chelmsford and Witham; Witham and Marks Tey; and Marks Tey and Colchester. All telecommunication circuits will be cabled and train describers installed between Shenfield and Colchester.

Some work has already begun on the station buildings and this part of the scheme is expected to be completed by the autumn of 1960. Some inconvenience to passengers must be expected with a scheme of this magnitude, but every effort will be made to keep this to a minimum. The work will be carefully staged throughout in conjunction with the completion of the track and other engineering items. Temporary facilities for passengers will be available during the whole period of reconstruction.

The civil engineering work will be carried out under the general direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region.

St. Pancras–Bedford Diesel Service Inaugurated

Four-car sets introduced for accelerated services in January

The inaugural run took place on September 28 of a four-car multiple-unit diesel train, one of a series built at the Derby Works of British Railways, London Midland Region, with Rolls-Royce engines, for the L.M. Region, St. Pancras to Bedford service.

The Mayor of Bedford, Alderman C. N. Barrott, welcoming the party on arrival of the train at Bedford Midland Road, expressed the satisfaction of his community that its interests had been considered in effecting improvements in the service. The new trains would provide facilities better than those for which Bedford had hoped, and he was pleased that many others at intermediate stations would benefit.

Railways Sensitive to Public Requirements

Mr. David Blee, General Manager, London Midland Region, stated in reply that the new service was an example of how sensitive railway management was to the needs of the travelling public. One difficulty in answering demands of this kind was the time factor in producing the new rolling stock and in improving track, signalling, and intermediate stations.

The people of Bedford and neighbouring communities had asked for the new service. It had cost £2,500,000. If their request was genuine they should now patronise it to enable British Railways to obtain a good return. He hoped that the results would increase prosperity in the area.

Others present at the ceremony included: *British Transport Commission Central Staff:* Mr. J. F. Harrison, Chief Mechanical Engineer. *London Midland Region:* Messrs. E. W. Arkle, Director of Traffic Services; A. E. Robson, Chief Mechanical & Electrical Engineer; R. W. Crawshaw, Public Relations & Publicity Officer; R. L. E. Lawrence, Divisional Traffic Manager, London; W. N. Roberts, District Passenger Manager, Euston; J. C. Rogers, District Operating Superintendent, St. Pancras; C. J. North, District Motive Power Superintendent, Kentish Town.

Mr. Alan Lennox-Boyd, M.P. for Mid-Bedfordshire; Mr. Christopher Soames, M.P. for Bedford; and the Mayors and other representatives of communities served by the new trains.

An illustration and brief description of one of the four-car sets, with preliminary details of the accelerated service, appeared in our June 5 issue. Until January 3, 1960, a mixed steam and diesel service will be run to the existing timings. From January 4, when the accelerated all-diesel service begins, trains will run half-hourly from Bedford and half-hourly from Luton to St. Pancras throughout the day with additional trains at peak periods. Bedford will have 44 instead of 31 trains other than main-line expresses to and from St. Pancras, Luton 88 instead of 50, St. Albans 100 instead of 79, and Elstree 45 instead of 30. By semi-fast diesel train the running time from St. Pancras to Bedford will be 70 min., to Luton 43, to St. Albans 28, and to Elstree 20. Trains stopping at all stations will take a little longer.

The rolling stock has been specially-designed to meet the needs of the fluctuation of traffic in peak and off-peak periods. They have been built as four-car sets but will be coupled to run as trains of eight cars in peak periods. A four-car set consists of a motor brake open second, trailer lavatory second, trailer second, and a motor brake open second. Each motor car is powered by two 238 b.h.p. Rolls-Royce eight-cylinder normally aspirated engines, giving a total for the four-car set of 952 h.p. and a maximum speed of 70 m.p.h. The motor car weighs 39½ tons and the trailer 28½ tons. There are seats for 352 second-class passengers in semi-open compartments.

Precautions for Safety

Each engine and its three-stage torque converter drive can be independently isolated so that in the event of one failing it is not necessary for the train to be taken out of service. An automatic fire extinguishing system will shut-down any affected engine and ring fire alarm bells in driving cabs and brake compartments. The guard's signal to start the train is given to the driver by internal buzzer and there is also a telephone for communication between driver and guard. These are the first British Railways vehicles to be fitted with four-digit route-indicators.

Lighting is a feature of unusual interest. The supply from a 24-V. battery system is stepped up to 240 V. 1,000 cycles a.c. by A.E.I. transistor oscillators, each arranged to feed one 4-ft. 40-W. fluorescent lamp. The tubes are arranged in a single line down the centre of the ceiling of each vehicle. The lighting of driving cabs and brake vans is independent of the passenger lighting and is controlled by two-way switches adjacent to the doorways. The power car batteries are charged from engine-driven generators and those on the trailer cars from axle-driven generators.

Mr. David Blee at Bedford after arrival of the inaugural diesel train on September 28. Mr. R. L. E. Lawrence is second from right, at back

French Winter Train Services

The most important alterations in French National Railways passenger timetables are the accelerations resulting from extension of the South Eastern Region main-line electrification from Lyons to Valence and Avignon, which has made possible cuts in the times of all principal trains between Paris, Marseilles and the Riviera. The new timetable is effective from October 4.

The "Mistral" (1.10 p.m. from Paris Lyon) will now reach Marseilles at 8.43 p.m. and Nice at 11.38 p.m., both 17 min. earlier than last winter. The 9.15 a.m. *rapide* will gain 20 min. to Marseilles and Nice. The 8 p.m. "Blue Train" is 46 min. faster to Marseilles (4.43 a.m.), 27 min. to Nice (8.30 a.m.) and 22 min to Ventimiglia (9.43 a.m.). The "Paris-Côte d'Azur" at 8.10 p.m. will be speeded up to take up the former "Blue Train" times from Marseilles. onwards, reaching Nice at 8.57 a.m. (24 min. earlier) and Vintimille at 10.5 a.m. (29 min. earlier).

There are similar accelerations in the reverse direction. The "Mistral" for instance, will leave Nice and Marseilles 15 and 14 min. later respectively than now, and the Paris arrival will be 7 min. earlier, at 10.53 p.m. The "Blue Train," 7.2 p.m. from Ventimiglia and 8.5 p.m. from Nice, will start 20 min. later, but arrive Paris by 8.55 a.m., 2 min. earlier.

Substantial improvements in time will be given by a new diesel railcar connecting at Avignon with the "Mistral" in each direction to and from Nimes. With a change of trains at Narbonne, this will give a new service from Lyons at 5.18 p.m. to Toulouse, reached at 11.45 p.m., and also to Perpignan, reached at 10.42 p.m. Similar connections in the reverse direction will make possible a still faster journey of 9 hr. 17 min. from Perpignan (1.34 p.m.) to Paris.

On the electrified Paris-Arras-Lille main line the 9.12 p.m. first class *rapide* from Paris will start 33 min. earlier and stop additionally at Longueau. There connection will be made with a first class diesel railcar for Amiens, Abbeville, Boulogne, and Calais. The time of 3 hr. 6 min. for the 184 miles between Paris and Calais will be the fastest ever scheduled. In the reverse direction the railcar will start from Calais at 10.42 a.m., make the same stops, and connect at Longueau with a *rapide* from Lille, reaching Paris at 1.54 p.m.

London-Riviera Air-Rail Service

The Air Transport service between London and Paris is to be continued, but without the benefit of the fast railcar connection on the French side. Instead, the 2.40 p.m. from Calais (in connection with the 11 a.m. service from Victoria) will stop at Etaples to pick up passengers, and the 12 noon from Paris will leave at 11.57 a.m. and stop at Etaples to set down air passengers for England. The two trains concerned are those carrying the through sleeping cars, between Calais and Riviera stations, of the "Blue Train," and these Etaples stops will help the passengers who wish to curtail journey times between London and the Riviera by making an air crossing of the Channel.

BRITISH TRAVEL & HOLIDAYS ASSOCIATION ANNUAL MEETING.—The annual meeting of the British Travel & Holidays Association was held at Overseas House, St. James's Street, London, last Wednesday. The Duke of Richmond and Gordon, President of the Association, presided, and Sir Arthur Morse, Chairman, reviewed the development of Britain's tourist industry and outlined requirements for the future.

GLASGOW AUTUMN HOLIDAY EXCURSION ARRANGEMENTS.—Excursion trains were run last week-end for Glagow and Lanarkshire autumn holidaymakers, to Blackpool and Morecambe illuminations. Other features of British Railways, Scottish Region, arrangements for the holiday included a Sunday photographic excursion to the Central Highlands by diesel buffet train; land cruises by diesel train; restaurant car excursions to Forfar, Aberdeen, Fort William, Mallaig, and Carlisle; special trains to football matches and race meetings; and steamer sailings on the Firth of Clyde. A diesel buffer car excursion train for photographers was run from Glasgow Central Low Level on September 27, touring the Central Highlands via Gareloch, Loch Long, Loch Lomond, Loch Tay, and Loch Earn. Speed was reduced through some of the best scenic stretches. Prizes were awarded for the best black and white photographs, colour print, colour transparency, and 8-mm. colour 50-ft. film.

Contracts and Tenders

Rolling stock for the Nigerian Railway Corporation

The Crown Agents have placed the following orders for the Nigerian Railway Corporation :—

Talbot Waggonfabrik A.G., Aachen, Western Germany : 175 bogie covered goods wagons

Gloucester Railway Carriage & Wagon Co. Ltd. : 25 low-side bogie wagons

Birmingham Railway Carriage & Wagon Co. Ltd. : 16 bogie brake vans, 6 third class passenger coaches, 2 third class passenger brake coaches, and 3 canteen coaches.

British Railways, Eastern Region, has placed the following contracts:

W. & C. French Limited: demolition of existing superstructure to concourse and awning to platforms 1 and 2, provision of retaining walls and extension to concourse, reconstruction of ramps to platforms and the provision of new superstructure and roofing to extended concourse and new awning to platforms 1 and 2 at Enfield Town Station

Carter-Horseley (Engineers) Limited: alterations to portion of overhead bracing of Keadby Lift Bridge carrying roadway over River Trent, between Althorpe and Scunthorpe & Frodingham

W. & C. French Limited: provision of relay room and changeover station at Leigh-on-Sea, and feeder station at Barking

Hosking & Son (Essex) Ltd.: construction of new control station at Pitsea

J. B. Corrie (Flextella) Limited: renewal of fencing alongside running lines in the Sheffield District

W. & C. French Limited: construction of new station buildings and staff accommodation building at Broxbourne

Wellerman Bros. Ltd.: reconstruction and widening of overbridges Nos. 157 and 178, between Chelmsford and Witham

Constable, Hart & Co. Ltd.: resurfacing of roadways in the Kings Cross, Stratford, Ipswich, Doncaster, Sheffield, and Peterborough Districts

South Wales Switchgear Limited: erection of equipment for 6.25-kV. feeder stations and track sectioning cabins for 50-cycle a.c. railway electrification and other works in connection with the Enfield-Chingford-Hertford East-Bishops Stortford electrification and conversion to 25-kV system of the Liverpool Street to Southend line

Fuller Electric Limited: erection of equipment for 25-kV. feeder stations and track sectioning cabins for 50-cycle a.c. railway electrification and other works in connection with the Enfield-Chingford-Hertford East-Bishops Stortford electrification and conversion to 25-kV system of the Liverpool Street to Southend line

Matisa Equipment Limited: supply and delivery of one Matisa track recording trolley and associated equipment

W. & C. French Limited: provision of feeder station at Shenfield

Wright, Anderson & Co. Ltd.: fabrication, erection, and painting of steelwork for walls and roof of new carriage servicing depot at East Ham.

British Railways, London Midland Region, has placed the following contracts:

Thomas Storey (Engineers) Limited: supply, fabrication, and delivery of girderwork for bridge No. 96 on Speke Junction and Liverpool Edge Hill line

Kyle Stewart (Contractors) Limited: repairs to roof coverings at east end, centre, and south spans of Manchester Exchange Passenger Station

Rubery Owen & Co. Ltd.: sub-contract for supply and erection of structural steelwork at Etches Park Carriage Shed, Derby

The Harbour & General Works Limited: new reinforced concrete dredger quay for Heysham Harbour

Cementation Company: construction of bored piles and columns for the reconstruction and widening of bridge No. 14 at River Esk Viaduct

S. & C. Walmsley Limited: supply and erection of steelwork for low-level awnings and screens and roofing at Chester General Station

Leonard Fairclough Limited: construction of new offices and amenities building at Clegg Street Goods Depot, Oldham

Kyle, Stewart (Contractors) Limited: raising and strengthening brick walls of bridges Nos. 121, 120, 119, 117, 96, 92, 90 and 89 on London to Rugby line between Cheddington and Hemel Hempstead.

British Railways, Scottish Region, has placed the following contracts:—

Murdoch Mackenzie Limited: reconstruction of overbridge No. 54, Glasgow-Greenock trunk road, Bishopton

F. Braby & Co. Ltd.: steel roofing, sheeting, and glazing, for diesel maintenance facilities, Haymarket Motive Power Depot, Edinburgh

Motherwell Bridge & Engineering Co. Ltd.: three 30-000 gall. diesel-oil storage tanks, Aberdeen and Inverness

R. McCartney Painters Limited: cleaning and painting of South Esk Viaduct, Montrose

Aerocem (Scotland) Limited: painting and pressure grouting of masonry, Cononish Viaduct, Tyndrum Lower

Sir Wm. Arrol & Co. Ltd.: alterations and additions to superstructure, Clyde Bridge, Glasgow Central

Standard Telephones & Cables Limited: cabling of telecommunications and electric traction supervisory circuits south of River Clyde

Pirelli General Cable Works Limited: supply and installation of concrete troughing and installation of track feeder cables and connections

Murdoch Mackenzie Limited: subway access, platform and surfacing drainage, erection of footbridge, and so on, Hyndland new station

Blackburn (Dumbarton) Limited: alterations at Queen Street Low Level Station, Glasgow

James Crawford & Sons Ltd.: new signalbox, Bellgrove

Wilson, Kinmond & Marr Limited: culverting part of Monkland Canal and demolition and removal of underbridge No. 81, between Easterhouse & Blairhill

Dougall & Co. Ltd.: excavator, concrete and brick works for new signalbox, Balloch Central.

The Special Register Information Service Export Services Branch, Board of Trade, has received calls for tenders as follow:

From India :

Power signalling scheme at Delhi Main.

The issuing authority is the Northern Railway of India. Tender forms and drawings can be obtained from Chief Signal & Telecommunication Engineer, Northern Railway, Baroda House, New Delhi, on payment of Rs.10 to be deposited with the Chief Cashier, Northern Railway, Delhi. The closing date is November 30, 1959. The Board of Trade reference is ESB/22162/59.

150,000 tons of rails.
5,309 tons of fishplates.

The issuing authority is the Ministry of Railways (Railway Board), Government of India. The tender documents including drawings and specifications can be had on payment of Rs. 15 per set (or equivalent) from any of the following offices during working hours:—

The Director, Railway Stores, Ministry of Railways (Railway Board), State Entry Road, New Delhi; The Director-General, India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3; and The Director, India Supply Mission, 2536, Massachusetts Avenue, N.W. Washington 8 D.C. The closing date is October 28, 1959. The Board of Trade reference is ESB/22161/59.

From Vietnam:

2 portable air compressors
2 45-lb. jack hammers
1 ballast cleaning machine
1 ballast tamping machine.

The issuing authority and address to which bids should be sent is the Central Purchasing Authority, P.O. Box H-5, Saigon, Vietnam. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is October 21, 1959. The tender No. is 783-24089. Copies of tender documents including specifications and conditions can be obtained from The Vietnamese Embassy, 12 Victoria Road, London, W.8. When requesting copies the invitation number must be quoted. The Board of Trade reference is ESB/22316/59/ICA.

From Korea:

14½ *tonnes* of electric arc welding coated electrodes
175 wheels, wrought carbon steel
500 locomotive tyres
65 rolls of wire rope, plow steel, galvanised in various diameters
250 portable telephones for linesmen
776 vacuum tubes
13 oil heaters
1 diesel generating set
3 detectors and a quantity of spare parts for motors
A large quantity of telephone equipment including, breast sets, switchboard lamps, rectifier tubes, cable, inspection and cleaning equipment sets, teletype equipment test sets, electrical equipment test sets, telephone land sets, and train loudspeaker sets.

The issuing authority and address to which bids should be sent is the Office of Supply, Government of the Republic of Korea, Seoul, Korea. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is October 12, 1959. The tender No. is 591-R. The Board of Trade reference is ESB/22128/59/ICA.

From Sudan:

2 tyre turning and journal skimming tender wheel lathes.

The issuing authority is the Controller of Stores, Sudan Railways, Atbara. The tender No. is 2001. Bids should be sent to the Office of the Controller of Stores, Sudan Railways, Atbara. The closing date is November 11, 1959. The Board of Trade reference is ESB/22637/59.

From Belgium:

2 diesel-engine light rail motor tractors, 75-90 h.p. for standard gauge.

The issuing authority and address to which bids should be sent is the Ministère de la Défense Nationale, Administration Générale du Budget, Direction Générale des Approvisionnements, Direction Supérieure des Achats de Matériel, Service d'Achat du Matériel Automobile, Quartier Prince Baudouin, Place Dailly, Bruxelles. The tender No. is SAMA/70. 3471/91. The closing date is October 12, 1959. The Board of Trade reference is ESB/23053/59.

Further details relating to the above tenders together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

Notes and News

Institute of Transport Anniversary Luncheon, 1959.—The anniversary luncheon of the Institute of Transport, which will be the fortieth anniversary of the founding of the Institute, will be held on Tuesday, November 3, at 12.15 for 1 p.m., at the Connaught Rooms, Great Queen Street, W.C.2.

Closure of U.T.A. Branch Lines.—No objection had been received by the Northern Ireland Ministry of Commerce, at the time we went to Press, to the proposed withdrawal of the Ulster Transport Authority goods service on the Cookstown Junction to Kilrea and Coalisland to Cookstown branches. The U.T.A. announced some time ago that it would discontinue services from October 1. The withdrawals complete the closing by the authority of seven stations in south-west Antrim and south Londonderry. Passenger traffic on both lines ceased some years ago.

Persian Minister Visits Workington Iron & Steel Co. Ltd. Plant.—Major-General Vali Ansari, Persian Minister of Roads & Communications, who was the guest, last week, of H.M. Government during his stay in Britain, visited the Moss Bay Works of the Workington Iron & Steel Co. Ltd., a branch of the United Steel Companies Limited, on September 21. In the last 10 years many thousands of tons of permanent way materials have been delivered by the firm to the Persian State Railways in implementation of plans for reconstruction and rehabilitation of that system. At present the Workington Iron & Steel Co. Ltd., with other British manufacturers, is executing a contract for 22,500 *tonnes* of steel rails for the Persian State Railways. In the last five years the company has obtained for itself and on behalf of other British manufacturers of permanent way materials, rail orders from Iran amounting to 130,000 tons. Orders also have been obtained for other permanent way material such as fishplates and points and crossings. The value of this business is some £5,550,000. General Ansari was employed for some time on the Persian State Railways, of which he was Director-General for a short period before assuming his present appointment. He was accompanied to Workington by Sir George Binney, Export Director of the United Steel Group of Companies, who visited Persia before the last war to negotiate a contract for rails, and by Mr. H. A. A. While, London Manager. During his tour of the works he was shown one of the acid Bessemer converters. The accompanying illustration shows (left to right): Mr. J. Mellors, "blower" on the converter; Mr. F. B. Cawley, Steel Works Superintendent; Major-General Vali Ansari; and Mr. T. S. Kilpatrick, General Manager.

Reconstruction of Fairfield Street Bridge, Manchester.—British Railways, London Midland Region, is building a new bridge over Fairfield Street and Carston Street, Manchester, to replace two former structures which have been demolished. It will be completed by the end of the year. The work is being carried out as part of the London Midland Region electrification programme. The new bridge, which will be of pre-stressed concrete construction, is a single skew span of 170 ft. It will carry two rail tracks and an island platform for M.S.J. & A. line passengers.

British Waterways Exhibition in the Oslo Fjord.—British Waterways is to make a "meet the trader" tour of Norwegian ports early in October with a shipboard exhibition of photographs, models, and films showing the business and pleasure facilities that Britain's canals and inland waterways can give to Norwegian traders, shippers, and tourists. This new approach to the customer in his own country will be led by Major-General Sir Reginald Kerr, General Manager, British Waterways. With

Major-General Vali Ansari during his visit to the Moss Bay Works of the Workington Iron & Steel Co. Ltd.

the co-operation of the Ellerman's Wilson Line, the exhibition will be held on board the ss. *Volo*, which will sail from Hull today, calling at Oslo on October 5 and 6, at Drammen on October 7, and at Larvik on October 8. It is likely that calls will also be made at Porsgrunn, Skien, Arendal and Kristiansand. Accompanying Sir Reginald Kerr will be Mr. T. H. Thornton, North Eastern Divisional Manager of British Waterways.

St. Pancras-Bedford Diesel Service Poster.—The poster reproduced in the accompanying illustration is being displayed at all the stations on the St. Pancras-Bedford line, British Railways, London Midland Region,

Poster produced by British Railways, L.M. Region, announcing the S. Pancras-Bedford diesel service

in connection with the introduction of the new diesel multiple-unit trains which came into operation on September 28.

Joint Meeting on Corrosion.—A joint meeting of the Iron & Steel Institute and the Corrosion Group of The Society of Chemical Industry will be held at 14 Belgrave Square, S.W.1, on October 15, at 2 p.m., to discuss the Sixth Report of the Corrosion Committee, published recently as No. 66 in the Special Report Series of the Iron & Steel Institute. The meeting will consist of three sessions dealing with atmospheric corrosion, protective coatings, and marine corrosion. Admission will be by ticket only.

Safe Driving Awards for London Busmen. Awards have been gained by 10,518 drivers of London Transport Central buses and trolleybuses for safe driving in 1958. The awards, made by the Road Operators' Safety Council, are being presented at ceremonies held locally. Bars for 38 years of safe driving have been gained by two and bars for 37 and 36 years by two and seven drivers, respectively. Silver crosses for 35 years of safe driving go to 14 men.

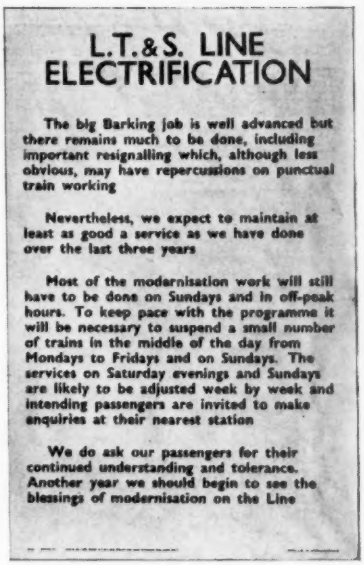
Demonstrations of Metrovick Welding Equipment.—A series of exhibitions and demonstrations in industrial centres by the A.E.I. Transformer Division will provide an opportunity for users and potential users of welding to see the latest types of equipment in operation. Equipment to be shown at the Midlands Electricity Board showrooms, Aston, Birmingham, on October 19-30, will include air-operated spot welders, projection welders and butt welders. Also an automatic arc welding machine will be demonstrated using the submerged-arc process. Single- and multiple-operator a.c. welding sets, rectifier arc-welding sets, and inert-gas arc-welding equipment will be shown.

Eastern Region Public Relations Poster.—The poster reproduced in the accompanying illustration has been issued by the Line Traffic Manager, London, Tilbury & Southend Line, British Railways, Eastern Region, in connection with the electrification and modernisation of the line. It is being displayed at all L.T. & S. line stations.

Transport Brakes Limited at Motor Show.—Transport Brakes Limited, of Bristol, will exhibit at the International Motor Show, Earls Court, London, on October 21-31, a wide range of brake liners, including brass wire interwoven asbestos, non-metallic woven asbestos, and zinc wire interwoven asbestos types. Similar combinations of materials in rolls, strips, and sheets and moulded clutch discs will also be displayed.

Tilbury - Gravesend Car Ferry Winter Service.—British Railways, Eastern Region, Tilbury-Gravesend motorcar ferry service was improved on October 1. Instead of reverting to the previous winter service interval of 30 min., the 20 min. service in the peak hours between 7.5 and 10.5 a.m. and between 4.5 and 6.5 p.m. continues as in the summer. During the off-peak periods there are ½-hourly departures until 8.5 p.m.

San Paulo Railway Trust Subsidiary.—At an extraordinary meeting to be held on October 7, at 1, Broad Street Place, London, E.C., members of the San Paulo (Brazilian) Railway Co. Ltd. will be asked to approve the formation of an investment trust subsidiary. The directors have decided on this action rather than convert the parent company into an investment trust. On August 31, 1959, the parent company's net current assets amounted to approximately £185,000.


L.T.&S. LINE ELECTRIFICATION

The big Barking job is well advanced but there remains much to be done, including important resignalling which, although less obvious, may have repercussions on punctual train working

Nevertheless, we expect to maintain at least as good a service as we have done over the last three years

Most of the modernisation work will still have to be done on Sundays and in off-peak hours. To keep pace with the programme it will be necessary to suspend a small number of trains in the middle of the day from Mondays to Fridays and on Sundays. The services on Saturday evenings and Sundays are likely to be adjusted week by week and intending passengers are invited to make enquiries at their nearest station

We do ask our passengers for their continued understanding and tolerance. Another year we should begin to see the blessings of modernisation on the Line

London, Tilbury & Southend Line electrification poster

Electrical Development Association Film.—A new film, "Industrial Electric Heating," has been produced for the Electrical Development Association by Verity Films Limited. It deals briefly with the theory, and at length with the practice, of electrical process heating of all kinds in most industries. It is designed for showing to factory managers and others whose technological experience is likely to be associated more with their

Opening of Storage Depot at Kings Lynn

Mr. W. A. G. Suddaby, Traffic Manager, Cambridge, British Railways, Eastern Region, with the Mayor of Kings Lynn, Councillor K. L. Wilbur, at the display of railway rolling stock on the site of the depot (see last week's issue)

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own trade than with things electrical. Students appearing in the film are used to justify the interpolation of diagrams and theoretical considerations within the life-like framework. The film was produced in Eastman Color by O. Skilbeck and directed by Seafield Head. It runs for 30 min., and is available on free loan in both 16 mm. and 35 mm. from the Electrical Development Association, 2, Savoy Hill, London, W.C.2.

Gloucester Railway Carriage & Wagon Co. Ltd. Results.—Group net profits of Gloucester Railway Carriage & Wagon Co. Ltd. for the year ended May 31, 1959, amounted to £206,952 (against £227,239 in the previous year) after tax of £193,647 (£267,553). Of the profit £30,306 (£27,871) was retained by the subsidiaries, leaving a balance of £176,646 (£199,368) to be dealt with by the parent. As recorded last week, the final ordinary dividend is to be 10 per cent, making 15 per cent for the third successive year. The preference and ordinary dividends account for £107,739 (£103,339), leaving a balance of £72,679 (£68,772) to go forward.

Scotby Station to be Closed.—Because of the loss being incurred, Scotby Station on the Newcastle-Carlisle line of British Railways, North Eastern Region, is to be closed from November 2. This measure has been approved by the Transport Users' Consultative Committee for the North Western Area. United Automobile Services Limited Buses operate in the area. Parcels traffic and small consignments of goods traffic will continue to be collected and delivered by British Railways Road Motors operating from Brampton Junction. Full wagon loads of freight traffic will be dealt with at Carlisle.

Forthcoming Meetings

October 7 (*Wed.*).—Peterborough Railway Discussion Group, at the Peterborough Technical College, Eastfield Road, at 6.45 p.m. Paper on "Industrial Relations—How?" by Mr. C. S. McLeod, Manpower Adviser to the B.T.C.

October 7 (*Wed.*).—The Institution of Railway Signal Engineers, York Section, at the Signalling School, Toft Green, York, at 5.30 p.m. Paper on "The protection of facing points," by Mr. O. S. Nock.

October 7 (*Wed.*).—Electric Railway Society, at the Fred Tallant Hall, 153, Drummond Street, London, N.W.1, at 7.15 p.m. Paper on "Keeping Underground wheels turning," by Mr. J. G. Bruce.

October 8 (*Thur.*).—British Railways, London Midland Region Lecture & Debating Society, in the Clerical Staff Dining Club, Cardington Street, Euston, N.W.1, at 5.45 p.m. Debate with Southern Region Society.

October 8 (*Thur.*).—Railway Correspondence & Travel Society, Bristol and District Branch, at the Grosvenor Hotel, Bristol, at 7.15 p.m. Paper on "I. K. Brunel," by Mr. C. E. Rowther.

October 8 (*Thur.*).—Railway Correspondence & Travel Society, West Midlands Branch, at the Exchange & Engineering Centre, Stephenson Place, Birmingham. Paper on "The Cambrian Railway," illustrated by Mr. Green.

October 8 (*Thur.*).—Railway Correspondence & Travel Society, West Riding Branch, at the Railway Institute, York, at 7.15 p.m. Paper on "Y.P.O. post marks," by Mr. A. Jennings.

October 10 (*Sat.*).—Permanent Way Institution, London Section. Visit to Belfast. Joint visit with Irish Section.

October 10 (*Sat.*).—Permanent Way Institution, York Section. Visit to Exors. of J. Mills Bredbury Steel Works, near Stockport.

October 12 (*Mon.*).—Institute of Transport, at the Jarvis Hall, R.I.B.A., 66, Portland Place, W.1, at 5.45 for 6.15 p.m. Presidential Address by Mr. R. G. Grout.

October 13 (*Tue.*).—Permanent Way Institution, York Section, in the Railway Institute, York, at 6.45 p.m. "The Tilley lamp," talk and demonstration, by Mr. E. J. C. Atkinson, the Tilley Lamp Co. Ltd.

October 13 (*Tue.*).—The Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.S. Guild Room, Toll Street, Nottingham, at 7.30 p.m. Paper on "Some aspects of locomotive fuel usage," by Mr. C. H. Attenborough.

October 14 (*Wed.*).—Peterborough Railway Discussion Group, at the Peterborough Technical College, Eastfield Road, at 6.45 p.m. Paper on "Railway trade unions' approach to modernisation," by Mr. C. W. Evans, President, National Union of Railwaymen.

October 14 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society, at the Chapter House, St. Thomas' Street, S.E.1, at 5.45 for 6 p.m. Opening night. Guest speaker, Major-General Wansbrough-Jones, Secretary-General to the British Transport Commission will address the society on "Modernisation in perspective." Mr. C. P. Hopkins will preside.

October 14 (*Wed.*).—Institution of Railway Signal Engineers, London Section, at the Institution of Electrical Engineers, Savoy Place, W.C.2, at 6 p.m. Paper on "Signalling equipment on 50 cycle electrified lines," by Mr. W. M. Sweetenham.

October 17 (*Sat.*).—Permanent Way Institution, York Section, in the Railway Institute, York, at 6.45 p.m. Northern Conversazione.

Railway Stock Market

Caution has been the keynote in stock markets, with buyers generally awaiting the result of the general election. With business generally on a smaller scale on the Stock Exchange, very little activity has been reported in foreign rails. Most quotations in this section were scarcely tested.

International Railways of Central America common stock was marked down from $20\frac{1}{2}$ a week ago to $18\frac{1}{2}$, and the preferred ordinary stock from $102\frac{1}{2}$ to $101\frac{1}{2}$. Antofagasta ordinary stock was fractionally lower at $13\frac{1}{2}$, and also the preference stock at 23; the 5 per cent (Bolivia) debentures were $92\frac{1}{4}$.

Chilean Northern 5 per cent first debentures changed hands around 60. Costa Rica ordinary stock remained at $17\frac{1}{2}$ with the first debentures at $80\frac{1}{2}$ and the second debentures $90\frac{1}{2}$.

Mexican Central "A" bearer debentures lost a point at $57\frac{1}{2}$. Paraguay Central first debentures remained at 22.

United of Havana consolidated stock was $1\frac{1}{4}$ with the second income stock 6. San Paulo Railway 3s. units lost most of their recent improvement, and at 1s. $7\frac{1}{2}$d., compared with 1s. $9\frac{3}{4}$d. a week ago. Brazil Railway bonds kept at $5\frac{3}{4}$.

West of India Portuguese capital stock at $106\frac{1}{2}$ and Barsi at 29 were the same as a week ago. Nyasaland Railways shares kept at 10s. 6d., but the $3\frac{1}{2}$ per cent debentures eased from $57\frac{1}{2}$ to $56\frac{1}{2}$.

Canadian Pacifics remained active, as usual, and at $48\frac{3}{4}$ were fractionally better than a week ago with the 4 per cent preference unchanged at $56\frac{1}{2}$, but the 4 per cent debentures at $63\frac{3}{8}$ compared with $64\frac{1}{2}$ a week ago. White Pass shares were maintained at $13\frac{3}{4}$.

Gloucester Wagon 10s. shares have come back from 18s. a week ago to 16s. 6d., but on the basis of the maintained 15 per cent dividend, there is a yield of fully 9 per cent. Activity continued in Westinghouse Brake shares, which, however, eased from 49s. to 48s. 6d. Charles Roberts 5s. shares also reflected the prevailing trend in stock markets, and were 13s., compared with 13s. 6d. a week ago. G. D. Peters were again 18s. $1\frac{1}{2}$d., and in other directions, Beyer Peacock 5s. shares eased from 8s. to 7s. 9d. North British Locomotive lost ground and were 11s., compared with 11s. 9d., but Birmingham Wagon strengthened from 29s. $10\frac{1}{2}$d. to 30s. $1\frac{1}{2}$d., though Wagon Repairs 5s. shares have firmed up from 9s. 9d. to 10s.

Ransomes & Marles 5s. shares continued to attract attention and were again higher at 23s. 6d., which compared with 23s. a week ago. Dowty Group 10s. shares also improved, from 37s. to 37s. 9d., but Pressed Steel 5s. shares reflected some profit-taking and eased from 32s. to 31s. 6d.

Among electricals, Associated at 60s. 3d. were maintained on balance, but General Electric lost their recent improvement, and at 39s. compared with 40s. 6d. a week ago. English Electric were 42s. 6d., compared with 43s. 9d. Crompton Parkinson 5s. shares were 13s. $10\frac{1}{2}$d., and A. Reyrolle 92s. xd. Stone-Platt shares strengthened from 50s. 3d. to 50s. $7\frac{1}{2}$d., and B.I. Cables were 51s. 9d. On the other hand, Ruston & Hornsby eased from 23s. to 22s. 6d. and Babcock & Wilcox from 48s. 3d. to 47s. 9d., but T. W. Ward strengthened to 100s., and there was a further rise in Davy United—from 81s. 6d. to 84s. Vickers came back further from 28s. 6d. to 27s. $4\frac{1}{2}$d. and Cammell Laird 5s. shares at 7s. 3d., compared with 8s. a week ago, were also under the influence of the half-yearly statement.

OFFICIAL NOTICES

THE NIGERIAN RAILWAY CORPORATION invites applications for the following post:—

SENIOR ASSISTANT COMMUNICATIONS ENGINEER.

Duties: The officer will be responsible to the Signal Engineer or his representative for the Planning, Installation, Maintenance and development of:—

(*a*) Teleprinter and Telegraph Systems, Single and Multi-channel.

(*b*) Carrier transmission and Multi-channel voice frequency systems.

(*c*) Radio, HF, VHF Systems.

(*d*) Telephone Exchanges, Automatic and Manual.

(*e*) Pole Line and Cable Systems.

Qualifications: Candidates must have a sound theoretical and practical experience in the principles of communications and modern developments therein. A working knowledge of Telephone Train Control and Single Line Block Working apparatus as used on Railways would be an advantage. Candidates with Associate Membership of the Institution of Electrical Engineers in Communications or Radio may be given preference. Candidates must have held a responsible post in the field of communication for five years, and must have a minimum of 10 years' experience in communications.

Salary: In scale £1,875 x £50 per annum to £2,075 (inclusive of Overseas Pay). Appointments may be on pensionable terms or on contract with a gratuity payable on completion of contract at the rate of £31 5s. 0d. to £34 11s. 8d. for each completed month of service.

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